THE FOUNDRY

A TRADE JOURNAL

DEVOTED TO THE INTERESTS OF THE WHOLE FOUNDRY BUSINESS

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OCTOBER, 1895.

Vol. VII No. 38.

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DETROIT, MICH.

It Sounds funny when we say

that we do not like to advertise this article, and an explanation is necessary. Here it is. There are thousands and thousands gross of steel wire casting cleaning brushes sold every year (when business is good) in this country. We sell twenty or thirty dozen ourselves(?) and we know positively.

BRUNNELL'S PATENT WIRE WHEEL

wherever used reduces the trade on hand brushes, and this means loss business for us: But we also know that if we do not sell this Wheel Brush the inventor will find some one who will.

We have sold hundreds and hundreds of plain wheel brushes for special work that could not be cleaned with hand brushes. As soon as the wires were broken the brush could not be used and another one had to be purchased. With this it is different.

The Wires Can be Renewed.

It is useful, and above all practical, and is the only wire wheel brush that gives satisfaction.

It is durable and simple in construction and the aim of the inventor has been to construct a wheel to secure more rapid and efficient means of cleaning plain as well as difficult castings, and at less cost in saving of time, etc.

WISE REGARD FOR ECONOMY

has not been overlooked and the wheel is so constructed as to save the breaking of the wires.

The speed of the wheel should be about one thousand. The work should not be pressed too hard against the brush as this will prevent the wire from bending if this should happen reverse the wheel. Another reason is by pressing to hard the sides of the wire instead of the points strike the work, and the wheel will not work as well as if the cutting points came in contact.

IT CAN BE PLACED IN ANY KIND

of polishing or grinding machines, or on lathes. We furnish the wire twisted ready for use. The nut and disk are all there is to remove: Price of wheel complete with wire, $15.00. New wire for one wheel, $1.00 or 20 cents per pound. Address all communications to,

---

The J. D. Smith Foundry Supply Co.

MANUFACTURERS OF

Foundry Facings, Blackings,
Foundry Supplies and
Refiners of Plumbago.

CINCINNATI, OHIO,
U. S. A.

"The Proof of the Pudding is in the Eating."

The S. Obermayer Co. are pioneers in the **Foundry Facing** and **Supply** business.

The S. Obermayer Co. is the largest establishment of its kind in the world.

The S. Obermayer Co. is the largest concern in the world, importing and refining **Ceylon or East India Plumbago, Graphite or Silver Lead**—also leaders in **German, Bohemian and Mexican Graphite or Black Lead.**

The S. Obermayer Co. have the largest mill in the world manufacturing exclusively, **Sea coal** or **Bituminous Facings** of the highest grades and the finest textures, the greatest strength and the purest in carbon and, in short, the BEST on earth. We refer to our mill at Larimer, Pa.

The S. Obermayer Co. have the newest and model mill of the world for the manufacture of fine grades of FOUNDRY FACINGS and BLACKINGS, and the best proof thereof, is that among the many handsome casting exhibited at the recent WORLD'S FAIR at Chicago; especially the beautiful STOVES there, shown by American Exhibitors, fully two-thirds were made with the aid of the **S. Obermayers Co's. incomparable stove-plate facings** and their refined, pure East India Plumbago; so it was also with most of the other classes of American castings exhibited there. The best were made with Obermayer facings or blackings. Is not that a record to be proud of?

In the year 1894, **we made and sold 11,452,700 pounds fine Foundry Facings, Plumbago, &c., and sold 868,100 pounds of Foundry Supplies,** at our factories in Cincinnati, Chicago and Larimer, Pa. This more than equals the combined production of all similar factories in the United States; and we are in a fair way to double that in 1895.

Our specialties are the manufactures of only the BEST qualities of qualities of FOUNDRY FACINGS or BLACKINGS, for the HIGHEST TYPE of MACHINERY, ARCHITECTURAL, STOVE-PLATE and FINE ART CASTINGS.

In connection with the above, we keep in stock, a large supply of all that a Brass, Iron or Steel Foundry requires to be thoroughly equipped.

Do not forget the wonderful effects that our **Silver Leads, Graphites, Plumbagos, Perfect, Peerless** and **Brilliant Washes** produce. The economy in using them also.

Trial samples of our Facings and other manufactures free of charge.

Illustrated catalogue and price-list of 118 pages mailed free on application.

THE S. OBERMAYER CO.

CINCINNATI, O.

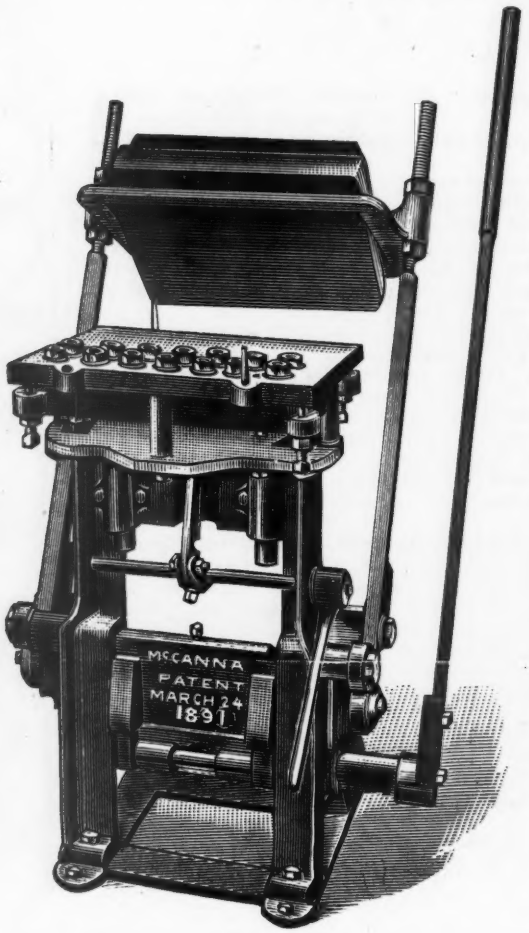
CHICAGO, ILLS. LARIMER, PA.

General Office—Cincinnati, O.

The McCanna Improved Moulding Machine

PATENTED MARCH 24, 1891.

(NEVER BEFORE ADVERTISED.)



Our Special Claims

Over other moulding machines are simplicity in construction and convenience of operation.

These Machines

Have an Automatic Reversible Rammer and Tucker (*Pean and Butt Rammer*) and are operated by one stroke of the lever.

Size of Flasks—11x15x3 in.

Weight of Machine—400 lbs.

CAPACITY of Machine, 30 flasks per hour, all gated, vented and ready to pour. The Rammer is constructed to conform with the sand, also allowing the air to escape while ramming, which equalizes the pressure. The machines are designed especially for light casting in brass, and are made interchangeable and of the best workmanship. This machine is almost invaluable where a large amount of duplicate castings are required. Any man or boy with ordinary intelligence can run it.

We supply the machine itself, also the Iron Flasks, Draw or Stripping Plates (on which the patterns are placed and can attach the patterns, either Plain or Draw Plate) also Flask Boards, etc.

We reduce the expense of moulding over hand work of 50 per cent. or more.

Price of Machine $150

Used in the following shops:

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McCAMBRIDGE & CO., Philadelphia, Pa.
CHAS. PERKES, "
C. A. BLESSING, "
J. E. LONERGAN & CO., "

This Machine will also make Iron Castings.

Any half pattern can be transferred to the Machine.

Send for new "Brass Foundry Catalogue" of Equipment and Supplies.

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"FOUNDRY SUPPLY DEPOT" OF

J. W. PAXSON & CO.

Philadelphia, Pa.

WHITEHEAD BROTHERS COMPANY,

——DEALERS IN——

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Philadelphia Sand, French Sand,
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Facings and Supplies of all Kinds,
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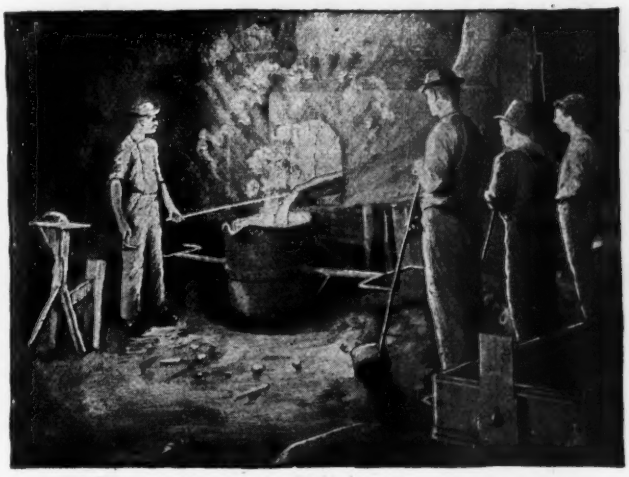
PITTSBURGH, PA., U. S. A.



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ANY GRADE OF

Moulding Sand . . .

THAT WILL TURN OUT SMOOTH AND PERFECT

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Heavy Machinery Castings
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Malleable Iron Castings,
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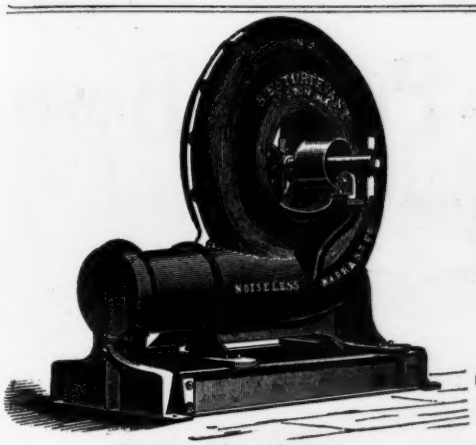

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THE STURTEVANT STEEL Pressure Blowers,

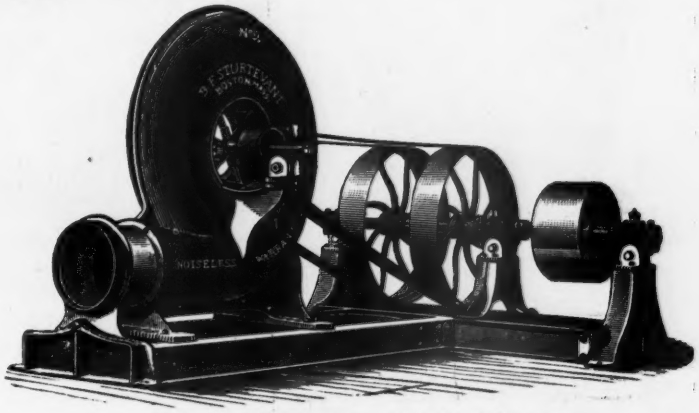
—FOR—

Cupola Furnaces and Forge Fires.

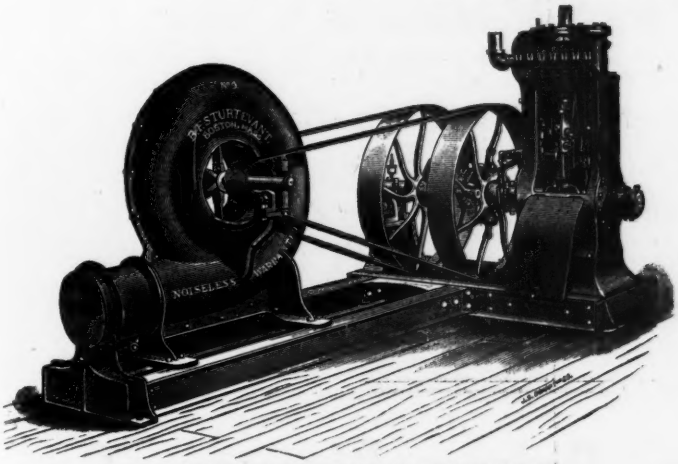
BLOWERS

Furnished without Bed with Separate Countershaft

BLAST GATES



Blower on Adjustable Bed with Combined Countershaft.



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Direct Connected

Electric Motors

Send for Catalogue.

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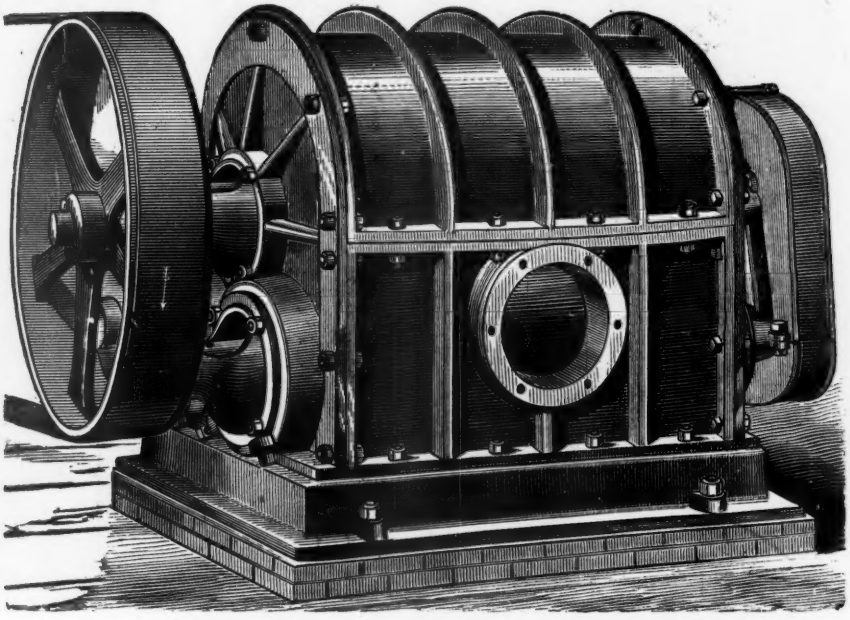
The Baker Rotary Pressure Blower

ONLY ONE BELT IS REQUIRED TO DRIVE THE LARGEST BLOWER.



The Best POSITIVE PRESSURE BLOWER for IRON FOUNDRY CUPOLAS, Pneumatic Tubes, Water Gas Works, Smelting Silver, Lead, or Copper Ores, Sand Blast, Forge or Knobling Fires, Ventilating Mines or Tunnels or any other purpose requiring a POSITIVE BLAST OR EXHAUST.

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We Make a specialty of 72 Hour
Foundry Coke.

ANALYSIS:

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Carbon,	88.21
Ash,	10.66
Sulphus,	.86
Phosphorus,	.017

These Few Lines tell the Story.

Try it. It is from a newly developed coal adjacent to the heart of the Connellsville Coke Bed. Freight rate is 16 cents per ton less than Connellsville. Shipments to all points via P. & L. E., L. S. & M. S. and N. Y. L. E. & W. Rys, and connections, only.

Correspondence solicited.

N. P. HYNDMAN, Sales Agent,

Room 8, Conestoga Building, 7 Wood St.

General Office, DAWSON, PA. **PITTSBURG, PA.**

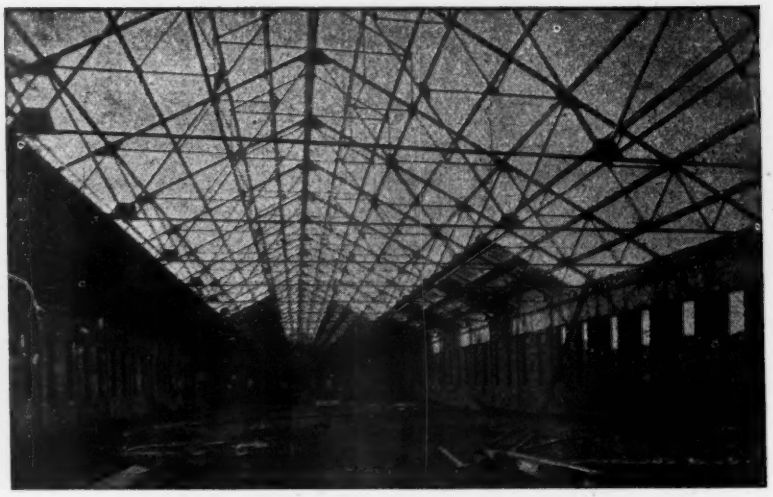
Wrought Iron Bridge Co.,

DESIGNERS AND BUILDERS IN
IRON AND STEEL
FIRE PROOF BUILDINGS

FOUNDRIES, MACHINE SHOPS
— FOR —
ETC., ETC.

Exterior of Foundry of Warder, Bushnell & Glessner Co., Springfield, Ohio.

Traveling and Jib Cranes for handling
Heavy Castings and Machinery.



Buildings Designed for Special
Requirements.

Interior Foundry Building of Warder, Bushnell & Glessner Co., Springfield, Ohio.

The roof of this building was erected by the Wrought Iron Bridge Co., Canton, Ohio, and consists of steel trusses supporting wooden purlins to which matched and dressed sheeting is nailed for slating. Trusses being 18 ft. above the floor, the wood work of roof is out of danger from fire, while the cover being of slate a suitable cornice to protect the overhanging of roof from flying sparks, or heat from the burning of neighboring buildings, renders this structure absolutely fire proof. Windows are set in the sides of ventilator throughout its entire length, so that ample light and ventilation is insured.

Wrought Iron Bridge Co.

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CANTON, O. KANSAS CITY, MO. CHICAGO, ILL.

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THE BERLIN IRON BRIDGE CO.,

ENGINEERS, ARCHITECTS

—AND BUILDERS OF—

Iron and Steel Bridges, Roofs and Buildings.

The above illustration is taken direct from a photograph and shows the interior of a Foundry Building which was designed and built complete by us for S. F. Hodges & Company, at Detroit, Mich. Each wing is 24 feet in width and the central portion is 40 feet in width, this latter controlled by a Crane with a travel the full length of the building. The crane girder posts are designed to carry jib cranes as shown. The roof is covered with our Patent Anti-Condensation Corrugate Iron. The building is absolutely fire-proof, and the corrugated iron roof is guaranteed not to drip during the coldest weather.

Office and Works, - - EAST BERLIN, CONN.

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THE "WELLS LIGHT"

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ALWAYS READY!

800 TO 2000 CANDLE POWER.

ESPECIALLY ADAPTED FOR

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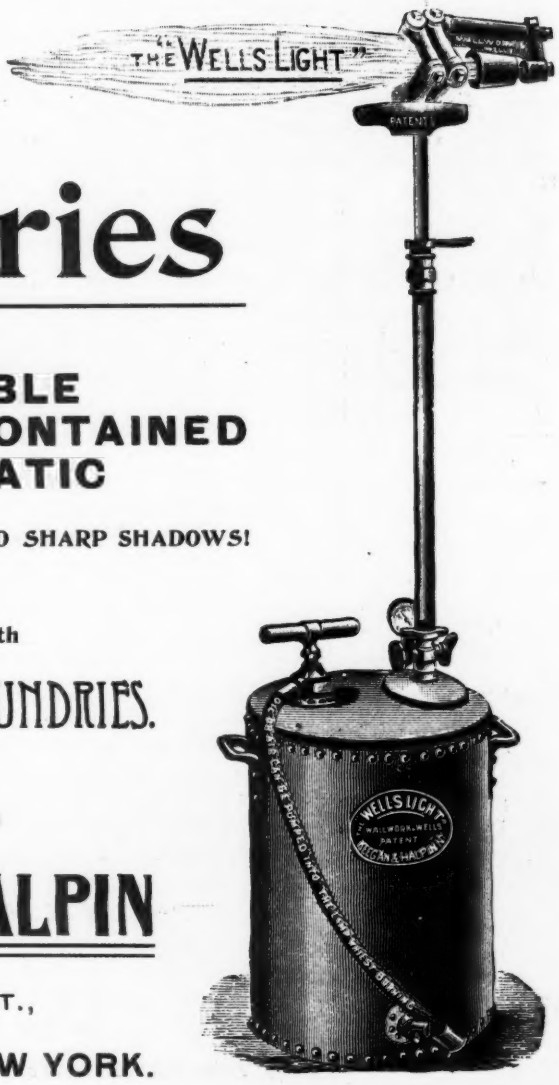

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SELF CONTAINED
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NO SMOKE! NO SPRAY! NO SHARP SHADOWS!

Now in Valuable Use with

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DIRECTORY OF LEADING PIG IRON DEALERS.

HUGH W. ADAMS & CO.

Pig Iron Merchants

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HENRY H. ADAMS & CO.

(Incorporated)

PIG IRON

"NORWAY" for Strength,
"HECTOR" for Softness

177 Broadway,
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CLINTON IRON & STEEL CO.

Manufacturers of the

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CELEBRATED "CLINTON" SOFTENER

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SIMPLE!
EFFICIENT!
PORTABLE!
RELIABLE!
EASILY OPERATED!
AND CHEAPER!

100 TO 4,000 CANDLE POWER,

GIVING A CLEAR, WHITE LIGHT.

Indispensible in all places where a Powerful and Portable Light is required.

. . FOR . .

FOUNDRIES

Boiler Makers, Bridge and Girder Works, Rolling Mills, Forges, Contractors and Builders, Stone Quarries, Ship Yards, Dry Docks, Coal Wharves, Harbor Works, Saw Mills, Dredgers, Street Railways, Bridge Building.

Requires No Skilled Labor!
Unaffected by Wind or Rain!
Can be Started in a Few Minutes!

Sherry Torch Co.

ROCHESTER, N. Y.

JOHN J. SHIPHERD, Pres. W. RUSSELL, Vice-Pres. and Mgr.
L. C. SHIPHERD, Sec'y and Treas.

THE

Phoenix Iron Works Co.

The following is a letter which was sent to us unasked for and is a sample of many genuine indorsements which we receive very frequently.

OFFICE OF
BERT. L. BALDWIN, M. E.
CINCINNATI, O.

PHOENIX IRON WORKS CO.
CLEVELAND, OHIO.

GENTLEMEN—As you may remember, you furnished a 10 ton traveling Crane which was erected at the Cummingsville Generating Station for the Cincinnati Street Ry. Co. This crane was erected for the purpose of handling the heavy parts of the Railway Generators. The easy working of this crane was appreciated by the party, who had the contract for erecting the generator, who found that where it required eight men at the hoisting chain of one of our other cranes, it only required three at your crane, with both cranes handling the same load. All of the details on this crane are well worked out and substantial, so that I expect that it will continue to give us the best satisfaction.

Yours respectfully,
(Signed) BERT L. BALDWIN.

MANUFACTURERS

Hand, Steam, Belt, Hydraulic and Electric Cranes

FOR ALL PURPOSES.

Foundry Ladles, Chains, and General Machinery

WASON STREET.

CORRESPONDENCE SOLICITED.
WRITE FOR CATALOGUE.

CLEVELAND, OHIO.

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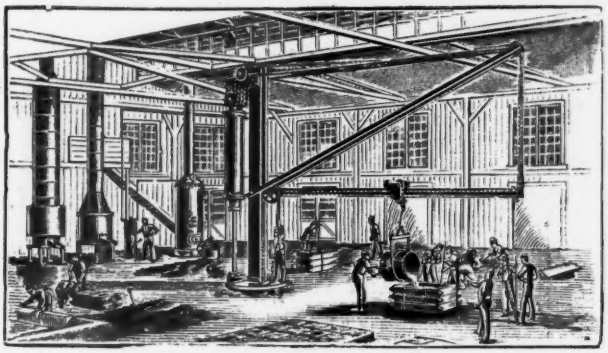
CHICAGO OFFICE, 1430 OLD COLONY BUILDING.

OH! FOUNDRYMEN, IF YOU ONLY KNEW



5-ton Ridgway Crane in a Foundry.

The Rensselaer Mfg. Co. of Troy, N. Y. have the contract for making the great 60 inch gate valves for the City of Allegheny, Pa. These valves are slungers and the castings very hard to make without losing many of them. This young concern knocked out all the old established valve makers in getting this contract because they were the only valve makers at that time equipped with Ridgway Cranes (others have gotten them since). So difficult are these castings to make, that a trade paper is making cuts to illustrate them as notable castings. We have seen what the Valve Co. wrote this paper. They were talking about the castings, not the crane. You just ought to hear them when they talk cranes! Here's what they say about the castings:—

* * * "We have made 15 of these pieces up to the present time without the loss of a single casting. We use the Ridgway Balanced Steam Hydraulic Crane in our Foundry, and **we attribute our great success to the gentleness, ease and smoothness with which these cranes handle difficult moulds of this description.**" * * *

Don't you know you can just **Paralyze** your competitors if your shop is equipped with Ridgway Cranes? If founders half realized just what this crane was in a foundry, 12 shops like ours couldn't make them fast enough. It's not advertising blow. Dozens of foundries will tell you it is so, that **the same moulders do 50 per cent. more work with the same wages with this crane than with any other.** Why, you can furnish castings at the same price as the other fellow's castings cost him and make a fair profit if you have Ridgway Cranes. Travel around and you will notice shops that have Ridgway Cranes are always full of work and making money.

Craig Ridgway & Son,

COATESVILLE, PA.

The Edw. P. Allis Co.

Milwaukee, Wis. have the largest foundry (exclusively for machinery castings,) in the United States. Its interior is shown by the following cut. . . . .

The daily melt is from 60 to 90 tons. All the heavy work is done under and handled by **THREE** thirty ton

Shaw Electric Traveling Cranes,

The first of which was put in operation in 1889, the second in 1891 and the third in 1893. Besides these, there are three more Shaw Cranes in the erecting and machine shops.

These Crane are Made Only by

THE SHAW ELECTRIC CRANE CO.

MUSKEGON, MICH.

——And Sold Only by——

Manning, Maxwell & Moore,

424 TELEPHONE BUILDING, PITTSBURG.

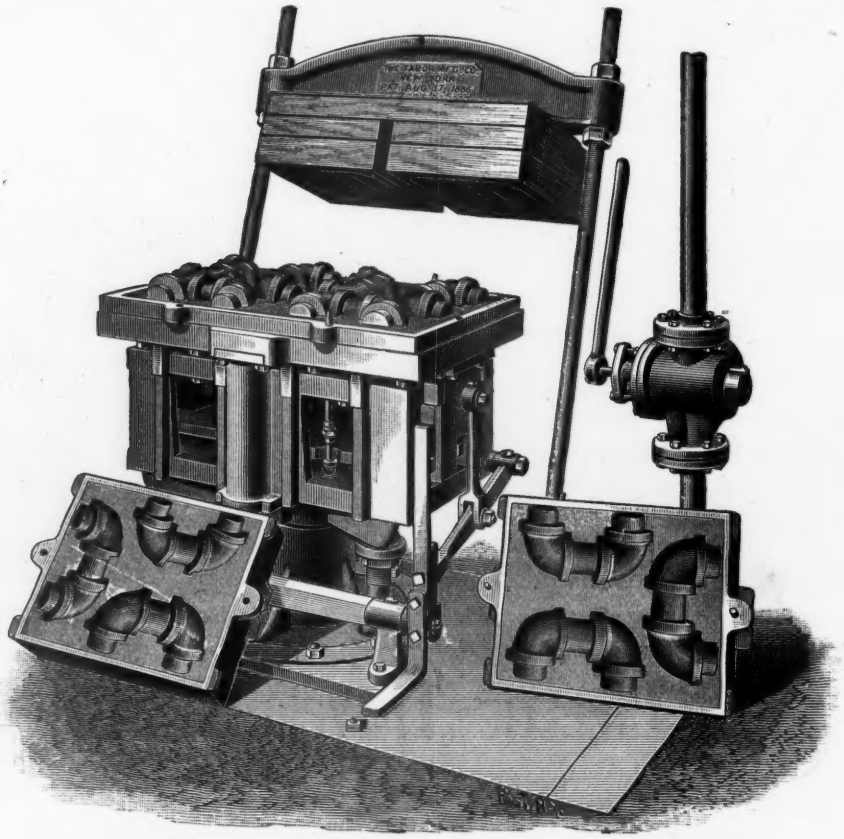
60 S. CANAL ST., CHICAGO, ILL. **111 LIBERTY ST., NEW YORK.**

The Tabor Manufacturing Co.,

—MANUFACTURERS OF—

AUTOMATIC MOLDING MACHINES

For Sand Molds for Metal Castings.



AUTOMATIC DUPLEX MOLDING MACHINE.

Molds both parts of flask at one operation of machine, thus making two machines in one.

These machines are adapted to general castings when made in reasonable quantities.

The use of these machines is a guarantee of economy, greater quantity and better quality in castings.

Foundrymen who are interested in producing cheap castings of superior quality are invited to correspond with the Company and call at the works, Front and Franklin Streets, Elizabeth, N. J., and see the machines in operation.

113 Liberty Street,

NEW YORK, - - - N. Y.

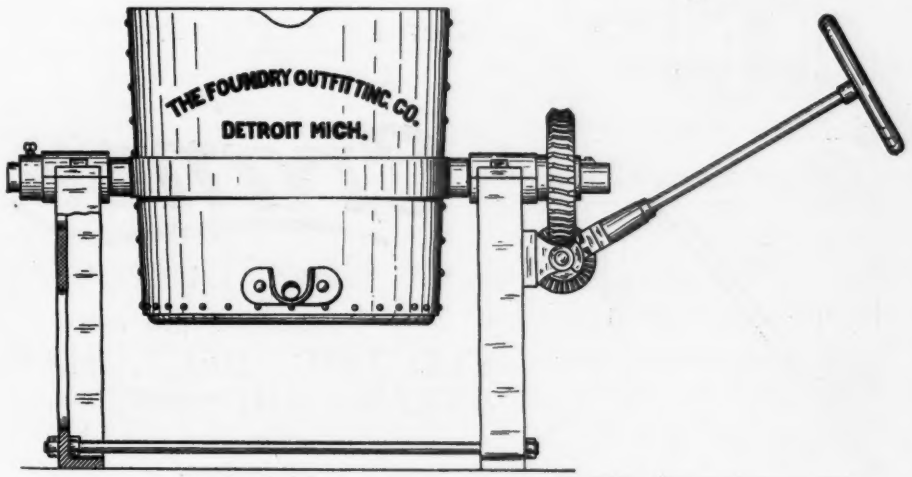
Cupola Furnaces
Blowers
Cranes
Compressors
Hoists
Elevators
Foundry and
Core Oven Cars
Ladles
Reservoirs
Tumbling Mills

Clean Iron

THAT IS WHAT YOU WANT!

THIS LADLE WILL GIVE IT TO YOU!

SIMPLE, DURABLE, and a PERFECT SKIMMER . . . .



GEARED SKIM LADLE.

Core Ovens
Sand Sifters
Brass Furnaces
Testing Machines
Trolley Tracks
Foundry Lights
Flasks
Fire Brick
Fire Clay
Molding Sand

One of our customers says **"it is the most complete Skimmer"** he ever saw, and that he does not see how he could do without it. . . . . .

"Everything Used in a Foundry."

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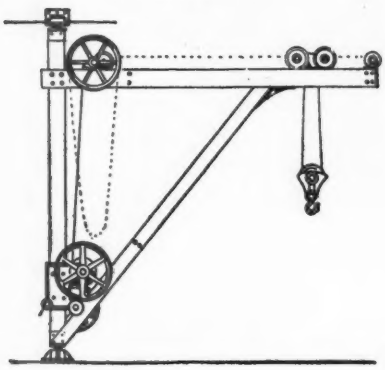

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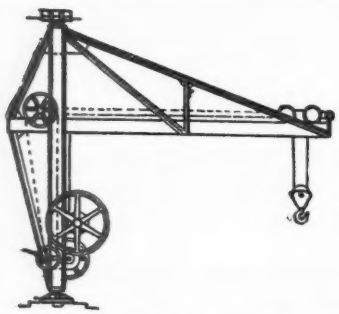

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THE FOUNDRY

VOL. 7. DETROIT, MICH., OCTOBER, 1895. No. 38

The Western Foundrymen's Association.

THEIR ANNUAL OUTING.

A Two Day's Session and Banquet in Milwaukee.

As previously announced, the September meeting of the Western Foundrymen's Association was held in Milwaukee, Wis., and judging from the oft-expressed opinion of those in attendance, it was one of the most enjoyable events they had ever participated in. Every arrangement possible had been made looking to the pleasure of those in attendance, and from start to finish there was nothing left to be desired in that direction.

When the steamer "Indiana," of the Goodrich Line, left her dock in Chicago on the evening of Tuesday, September 17th, she had on board a large and happy party. For several hours the pleasure of enjoying a ride on Lake Michigan kept the greater part of those present from seeking their staterooms, the time being agreeably spent in making new acquaintances, renewing old ones and enjoying that social intercourse possible only where a number of congenial good-natured spirits are gathered together and have much in common to talk about In the morning all the party were up and astir early and on arriving at the Plankinton House, where headquarters had been established, they found everything arranged for that could in any way contribute to their comfort. Here, also, they were joined by a large delegation from other points, who came in by rail from Racine, Waukesha, etc., as well as by a great number of Milwaukee foundrymen who exerted themselves to the utmost to make the visitors feel at home. Those present and their business affiliations were as follows:

John M. Sweeney and A. L. Bowen, Chicago Consolidated Iron & Steel Company, Harvey, Ill.

R. J. Cleveland, Cleveland & Barr, Chicago.

James A. Brady, Kurtz & Buhrer Foundry Company, Chicago.

A. Sorge, Jr., Chicago.

E. J. Welch, Geo. Hibben and J. W. Hughes, Weir & Craig Mfg. Company, Chicago.

H. S. Vrooman, Garden City Sand Company, Chicago.

E. J. Rodgers, Chicago Chemical Solution Mfg. Company, Chicago.

W. C. Waterbury, Forster, Hawes & Co., Chicago.

John K. Mackenzie, Dickman & Mackenzie, Chicago.

L. W. Lukens, Illinois Malleable Iron Company, Chicago.

A. Schillo, Schillo & Cossman Company, Chicago.

S. T. Johnson and A. T. Whiting, Whiting Foundry Equipment Company, Chicago.

John Meehan, Chicago.

H. L. Hotchkiss, Deering Harvester Company, Chicago.

Jas. S. Winn, Ward & Nash, Chicago.

H. F. Frohman, The S. Obermayer Company, Chicago.

B. T. Bacon and Jas. Fyfe, Pickands, Brown & Co., Chicago.

E. E. Hanna and Wm. Frguson, Gates Iron Works, Chicago.

Geo. W. Cope, The Iron Age, Chicago.

R. F. Palmer, Industrial World, Chicago.

J. A. Penton, THE FOUNDRY, Detroit, Mich.

John Pettigrew, Illinois Steel Company, Joliet, Ill.

W. M. Moore, Joliet Stove Works, Joliet, Ill.

F. M. Lyon, Burlington Route Foundry, Aurora, Ill.

O. J. Colton, Galesburg, Ill.

J. H. Dalton, Walburn-Swenson Company, Chicago Heights, Ill.

T. B. Walsh, Frost Mfg. Company, Galesburg, Ill.

D. McLean, Hammond, Ind.

H. M. Lane, the Lane & Bodley Company, Cincinnati, Ohio.

W. R. Warner, Matthew Addy & Co., Cincinnati, Ohio.

W. Myer, Ph. Meyer Company, Sheboygan, Wis.

H. G. Saecker, Appleton Machine Company, Appleton, Wis.

R. Miller, Appleton Hay Tool Company, Appleton, Wis.

R. A. Cook, Central City Iron Works, Stevens Point, Wis.

G. D. Sheriffs, Western Malleable and Gray Iron Mfg. Company, Pt. Washington, Wis.

J. T. Rowlands, Wm. Gebb and D. Evans, J. I. Case Tool Mfg. Company, Racine, Wis.

John Davies and W. O'Harrow, A. P. Dickey Mfg. Company, Racine, Wis.

J. T. Llewellyn, Bell City Malleable Iron Company, Racine, Wis.

L. E. Ellsworth, Racine Hardware Company, Racine, Wis.

W. P. Brown, Racine Iron Company, Racine, Wis.

J. W. Dearsley, S. Freeman & Sons, Racine, Wis.

C. G. Deissner and C. A. Haertel, Waukesha Malleable Iron Company, Waukesha, Wis.

C. A. Sercomb, Schwab & Sercomb, Milwaukee, Wis.

A. J. Bayley and Ed. Weber, Wm. Bayley & Sons Company, Milwaukee, Wis.

J. Harrison, Sol. Shaw and M. N. MacLaren, Jr., the E. P. Allis Company, Milwaukee, Wis.

E. K. Rundle, Rundle-Spence Mfg. Company, Milwaukee, Wis.

Capt. I. N. Bean, N. W. & Spring Lake Iron Company, Milwaukee, Wis.

L. D. Rosenheimer, Milwaukee Malleable Iron Company, Milwaukee, Wis.

T. J. Neacy and J. L. Monahan, the Filer & Stowell Company, Milwaukee, Wis.

F. Hoffman, Hoffmann-Billings Mfg. Company, Milwaukee, Wis.

J. G. Thompson, Milwaukee B. & C. Works, Milwaukee, Wis.

L. V. Shaw, Louis V. Shaw & Co., Milwaukee, Wis.

John G. Coleman, Wisconsin Malleable Iron Company, Milwaukee, Wis.

W. Wilson, Cleveland Facing Mill Company, Cleveland, Ohio.

In calling the meeting to order President J. M. Sweeney made a few congratulatory remarks on the large attendance, and referred to the comparative infancy of the association and the fact that this was the first of its meetings held away from home.

He hoped each member would do his best to see that the objects of the meeting became more thoroughly known and understood, to the end that their membership might be still further augmented.

The committee on by-laws reported progress and asked for further time, and the committee on permanent headquarters requested power to act, which was granted them in connection with the executive committee.

The secretary reported fifteen applications for membership, all of which were favorably acted upon and the applicants elected to membership. They were as follows:

Moore Mfg. & Foundry Company, Milwaukee; Dawes & Myler, New Brighton, Pa.; Cleveland & Barr, Chicago; Kurtz & Buhrer Foundry Company, Chicago; E. E. Hanna, Chicago; O. J. Oehring, Chicago; Ward & Nash, Chicago; R. A. Cook, Stevens Point, Wis.; E. Bement & Sons, Lansing, Mich.; The Lane & Bodley Company, Cincinnati, Ohio; Frost Mfg. Company, Galesburg, Ill.; Schillo & Cossman Company, Chicago; John Pettigrew, Joliet, Ill.; The Waukesha Malleable Iron Company, Waukesha, Wis., and the Phil. Meyer Company, Sheboygan, Wis.

The first paper of the day, entitled

"FALSE ECONOMY IN FOUNDRY EQUIPMENT,"

by H. Hansen, was then read by Secretary S. T. Johnson, as follows:

Most of you will probably say that you are as well acquainted with economy as you care to be; that your acquaintance with economy has taken the last degree of familiarity which you can tolerate; that another dose of this not altogether agreeable compound may end disasterously. Any one acquainted with the foundry business knows that at the present time the operation of a foundry compels the injection of several grains of economy at different places in order that there may be something left on the right side of the ledger.

The term economy poorly fits too many of

the savings made in the foundry. Not everything that makes a saving possible is economy; some attempts at saving might better be labeled extravagance. That the foundry industry has been prolific in examples of bad judgment and of calculations that failed to materialize is shown in the many wrecks by the wayside and in dividends that were far smaller than anticipated. The best is the cheapest, though some founders apparently act on the principle that the cheapest is the best. To such it seems economical to employ any article or tool that answers the purpose. It is said that a penny saved is a penny earned. I have seen foundries in which a penny saved has been a dollar lost.

American tools and appliances are said to be the most efficient in the world. But American tools did not become so universally approved by the efforts of the village mechanic nor by every shop contriving for itself whatever labor-saving device was needed. It was only by a concentration of mechanical skill and experience that American tool builders made themselves famous for the high standard of efficiency, the general utility and the simplicity of their products.

Shops producing their own tools exclusively are becoming scarce. Home-made contrivances are giving place to machinery perfected by specialists and installed on the purely business principle that they will lower the cost of the product. Making a special study of the needs of each industry has not only furnished better tools, but decreased their cost in corresponding proportion. The machine shop that would undertake to build a lathe or boring mill for itself would find itself greatly handicapped in the matter of cost, when compared with one of the regular tool works. But even leaving the question of first cost aside, how would the home product compare with that of a firm making a business of building such tools?

Would it give the same degree of efficiency with the same expenditure of power?

Power costs money, whether the prime mover be a foreign laborer at a dollar a day, or steam, air or electricity. Any tool that requires a greater amount of power than others of the same class and efficiency is not economical. Yet how many foundries disregard this altogether and purchase tools that are sometimes called regular steam-eaters, because they are cheap, and then pay the difference many times over in extra cost of operation.

The manufacture of foundry tools is becoming a trade by itself, and the men engaged in it are bending every energy toward developing superior appliances for the foundry. The ordinary chaplets, for which almost every foundry used to rely on the blacksmith nearest at hand, and which have probably been the cause of more castings being discarded and patched up than any other thing of their size, are being made by special methods and presented in a far superior condition, besides being placed on the market at a price which would not keep a blacksmith in tobacco. At the same time, there are many foundries that still insist on making their own inferior chaplets. Are they practicing economy?

Not long ago I was employed by a firm who concluded to make a grinder themselves rather than purchase one. They had the draftsmen, pattern makers, machinists and molders, with plenty of wood and pig iron in the background, so it entered their mind that there could not be much expense attached to converting this into whatever they saw fit. Owing to the ignorance of their foundry foreman, who was not accustomed to this class of work, the main casting or bed was cast three times before producing a passable piece of work. The smaller parts went the same way, and there was hardly a piece connected with it that was made on the first trial. In nearly every case success only came after some experience had been paid for. When it came to assembling, I have a distinct recollection of several pieces refusing to be put together. Parts which should have been cast separately were consolidated to make it easier for the pattern maker and machinist, with the result that lugs and projections protruded in such a manner as to resist all attempts at bringing them together. When I last saw these relics of an ill-fated enterprise they were covered with dust, and although times were dull and several shut downs became necessary, this firm who were going to make this machine so cheap never said a word about finishing it up and getting it ready to work.

The proprietors of a neighboring foundry about the same time found themselves in

want of a crane to replace an old rattletrap that threatened to fall down and carry with it more destruction than it was worth. Inquiring of several dealers in foundry equipments, they were surprised to learn that a crane would cost more than the charge for freightage. But they found a way to overcome this difficulty. They had a machine shop and foundry; they had all kinds of materials that are supposed to enter into the composition of a crane; they had men, too, who knew how to use up such material, so why should they not make the crane at home and get just what they wanted? But the making of cranes was not their business, so a well-paid employe was entrusted with the gathering of information on this ject. After a month spent in visiting places where cranes were in use, measuring their dimensions, finding out the ratio of their gearing, the 'size of chain used, etc., they were ready to make what patterns were necessary, and borrow and make answer whatever short shifts they could make up.

Perhaps you think they didn't make that crane work; but they did. And I understand that the intention was to cast a fancy name plate to adorn it, but this notion was reconsidered when they discovered the amount of power they had to furnish this creation of theirs before it would budge. Power is money, and if this foundry practiced economy in building a crane, say 25 per cent. less than they could purchase one for, when it required 75 per cent. more power to operate it, I want you to tell me where it is?

It takes a man with good abilities to become a good imitator, as it does to be a fair originator. In fact, it takes a very smart man and mechanic to execute a first-class job of imitation. It seems the easiest thing in the world to take a machine to pieces, secure its measurements and turn out duplicates. Yet how many of such imitations have the efficiency of the original when assembled and put through the real test of actual work?

As amateur tool builders most of our foundries do not achieve success. They may for a while be deceived by the external appearance of things, yet we all know how soon a dollar's worth of extra labor can be consumed on a crane or other tool without exciting suspicion. Such leaks are common and increase the cost of every pound of castings made, but it is seldom that a determined effort is made to locate them. There might be some unsavory disclosures that would endanger the position of many a designer attempting to administer to the wants of people with whose requirements he was entirely unfamiliar.

The admiration we show for the work accomplished by a tool is doubly increased if it only requires a minimum of power in its operation. Although none of us entertain the idea that work can be performed without the consumption of power, yet we have a high regard for those tools that get along with the least. We all recognize the advantage these have over others that call for a larger expenditure.

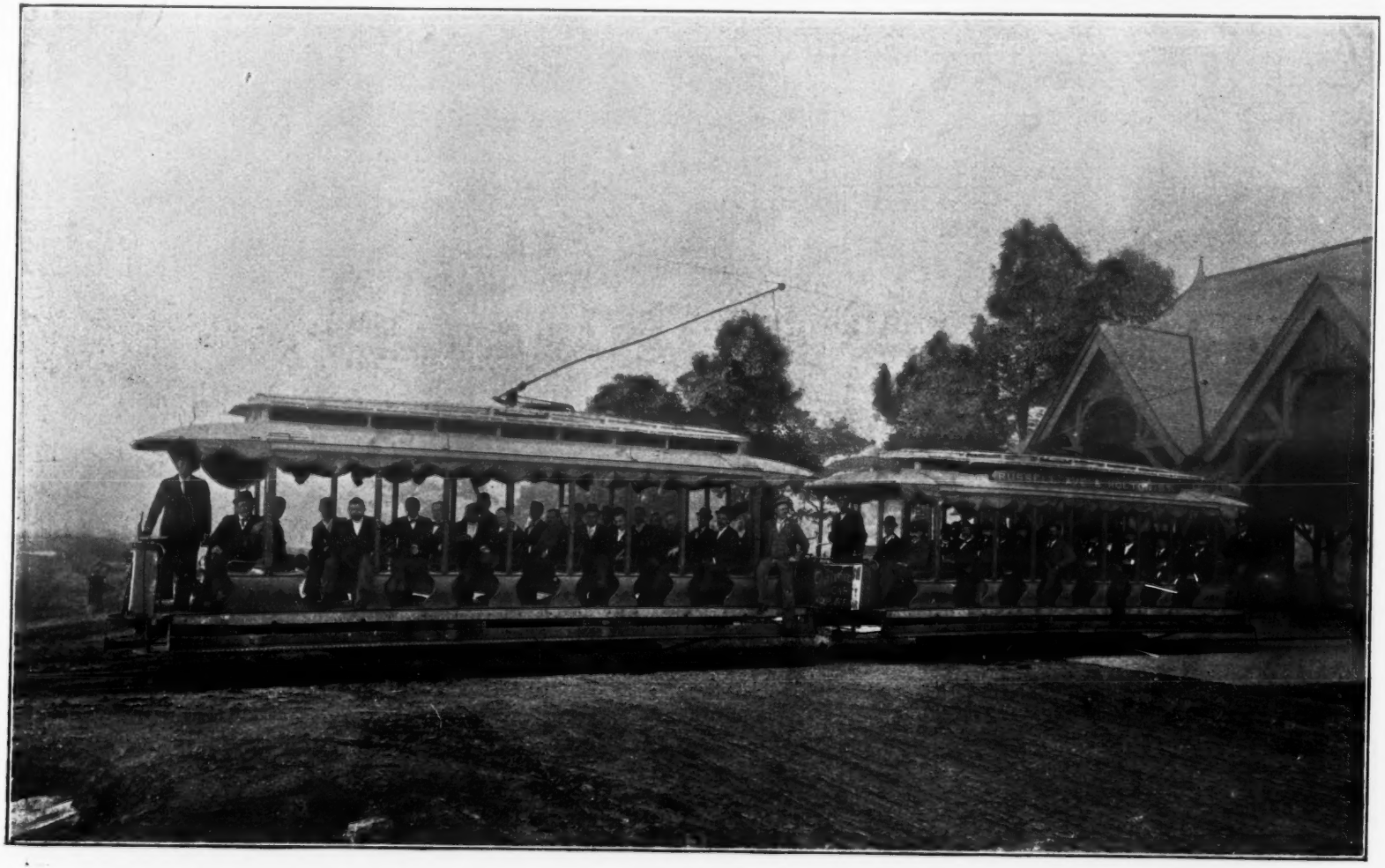
It is a false economy that suggests to many of our foundrymen to-day that labor-saving tools can be made at home and reach the same degree of perfection attained by builders who devote their whole time to tool building exclusively. Without reserve not one foundry in ten can produce a creditable tool, simply because such an attempt involves entering strange fields where experience must largely be paid for in failures.

In the discussion which followed several took part. Mr. Ferguson thought Mr. Hansen was on the whole right and that there were many cases where very poor management was shown, but he also knew of cases where good shops have saved money by making their own tools, and cited an instance where a firm of crane builders wanted $6,100 to alter some cranes from rope to electric power, while the firm did it themselves, and they thought equally as satisfactory, for $2,100.

The President: Mr. Ferguson, what is the most evident case of false economy in the foundry that occurs to you now, in your experience? I don't think this paper treats the subject quite as broadly as it might. It seems to be confined more to the questions as to whether it is advisable for foundries to make their own machinery.

Mr. Ferguson: I see so much of it I would not know where to start on that point. Cases occur every day in the foundry practice that would be called false economy by one man from observation. If he were made fully aware of all the conditions in connection with it he might finally approve of it as true economy. We are forced, especially in

Milwaukee Meeting Western Foundrymen's Association, Sept. 17 and 18, 1895. Members in front of Schwab & Sercomb's Foundry.



Milwaukee Meeting Western Foundrymen's Association. Members visiting chief Points of Interest as Guests of Milwaukee Foundrymen.

a jobbing shop where new jobs are coming in every day, to make shift to get that job out, while we know that it is a shiftless kind of rigging. We never expect to see the job again, and to an observer it would seem as though it was practicing false economy to make that job in that way, but to those knowing the conditions it is clear that it is the greatest economy.

E. E. Hanna: One cause of false economy is to employ cheap men; another is cheap iron—cheap to get out of the foundry, expensive in the machine shop. Cheap men make poor castings and have to make them over again. Cheap material is dear all the way through. Economy in any line of business is simply a question of careful consideration of all the points. It may be that, as Mr. Ferguson says, a makeshift would cost less both in time and labor for a job that is to be made but once than it would for a good, substantial tool to do the work, a tool that if you had hundreds or even ten of a piece to make it would make for itself many times over. Yet for one piece, the cheaper tool, the makeshift, is the better. It is simply a question of actual computation as to what the job is going to cost finished. Now, the economy point comes in a man's being able to sit down and carefully consider all the points involved in the question. It means that if a man will take up the first way of doing a job, blunder ahead and do it in that way—that would be false economy. To sit down and carefully think over a job, figure out all the ways and possibilities and take the cheapest under the circumstances—that is the true economy. Mr. Hansen's paper treats of the matter in a general way. It says nothing about any particulars, and particulars would last us all this meeting. There is no doubt whatever but there must be something wrong with people who are in the business of making tools if they are not better equipped and better posted to make better tools than a man that is in general work. It simply means that if you can make your tools cheaper than the people in that business you are either extraordinarily smart or else the people in the tool business are somewhat behind the times.

John Pettigrew: One thing that struck me in our friend's remark was that there are a great many things to be taken into consideration—for instance, the matter of fuel. I remember some years ago while working in a foundry that a party offered to sell some coke to the proprietor for 25 cents a ton less than he was paying at that time. He bought a carload of the coke and commenced to use it, making agricultural machinery. The consequence was the master wheels were all oval instead of round, and the other work that used to be good was sprung and broken. They could not tell for several weeks what caused the trouble, so at last it was decided to change the coke and go back to the old material that had been used before, and then everything went swimmingly. I think economy like that is a very false economy. There are other points that Mr. Hansen touches upon in his paper that I think economy can be used in—making tools for the shop, for instance. I know a party who not very long ago needed a crane; he got bids for the sort of work he needed, which amounted so something like $400. It was more than he could afford at the time and he decided to make it for himself. He counted up the actual cost and it was $62. I think that it would do perfectly well. It is only about six months ago that I first bought factory-made chaplets. We were making our own chaplets and we lost a great many castings from their not being properly made. After we had bought the first lot, for I think 60 cents per 100 chaplets, I commenced to figure up the cost of the chaplets we had been making, and found it had been $2.50, besides not having such a good article.

W. N. Moore: The general thought in Mr. Hansen's paper I heartily agree with. There are a great many points in connection with the economical operation of a foundry which are not even mentioned. There is one which occurs to me which may be apropos at the present time if the present improvement in business continues, as we all hope it will. That is, where is the point in capacity at which a foundry can be operated with the greatest net profit? I think the capacity of the foundry for economical operation is frequently overrated. It is my belief that many of us are carrying the idea too far that increased volume of business reduces expenses. I believe that if some of the periods in which work was most plentiful and our foundries were operated to their fullest extent were analyzed, although those periods are probably periods of greatest profit, it

would be found that the profit was not made on the very last part, the extreme end of the volume. When a foundry is operated to the point where efficient help cannot be brought to bear upon the various operations, when you must break in new men, it is our observation that the percentage of bad work increases, that there are all sorts of expenses. Some part of the machinery is overtaxed; there are breakdowns and night work and Sunday work, and there is a tendency to looseness in management that must be paid for. We go through a period of great strength with the idea that by pushing everything to the utmost we are making the most money out of it. Now, undoubtedly the business will give more profit by being operated fully than it will if it is being half operated, if the organization is complete. But what I want to call attention to is whether there is any real profit in overcrowding our foundries. I believe there is danger and the records of the establishments with which I am connected rather go to prove that—that is, they are disappointing. Our periods of great activity, when we have been overcrowded and have turned out the largest volume of business, have not made returns in profits that they theoretically should, taking the periods of slowness as a basis, and considering that our fixed expenses are spread over a much larger volume of business. That, it seems to me, is a question which is likely to arise with a great many in the coming year; perhaps it is already upon us. I know a great many foundries are not full up to the brim. It is a question whether it is best to produce with the greatest economy or to make extra effort and do the things which are necessary in emergencies and incur extra expenses. We certainly do not get the contentment out of the business that we do when we are working along with an even load.

E. E. Hanna: Following up Mr. Moore's idea, did anybody ever make anything by working nights or overtime? Sunday is worse than nights. I don't believe anybody ever made anything by pushing his plant beyond its capacity at all, but it certainly should be pushed just to its capacity to give us the best returns for the energy and the money invested. I believe that the larger the equipment, if properly handled, the cheaper we should do our work. The pushing beyond capacity applies in every case, small or large. I believe in buying a good tool and wearing it out just as quick as I can without abusing it; get all the work you can out of it, and get it out quick. That is, if you spend $1,000, say, on a tool, and you get that $1,000 worth out of the tool in one year, instead of keeping it to work for ten years, you get about nine times the profit from the machinery that you would to run it for ten years. That is, you get nine times the interest on the money invested. For that reason every tool should be pushed just to the limit of its endurance in legitimate work. Now, Mr. Pettigrew brought up another subject, the question of poor coke. What should the tonnage of a foundry be where they can afford to know what they are buying; where they can afford to keep a chemist, and know exactly what they are buying, what they have got to use and what they have got to get? There is a nut to crack.

John A. Penton: Following up the idea strictly that is brought up by Mr. Hansen's paper, I want to say that in my opinion the most flagrant and perhaps the most universal example of false economy in the foundries in America is the false economy that is used in trying to secure a foundry foreman a little cheaper than necessity requires. If by securing a first-class foundry foreman we do pay a little more, we perhaps make it up in many other ways. That is a sample of false economy that I believe is not universal, but more nearly so than any other one. If a first-class foundry foreman were secured who understood his business thoroughly, he would watch for little leaks--the matter of buying an inferior grade of iron, inferior coke, making suitable rigging to get out a particular job, the matter of seeing that the proper time is put in, the matter of seeing that a first-class mechanic is secured at a reasonable rate of wages, rather than in trying to save 15 or 20 cents a day and making it up by losing a $10 or $15 casting.

James A. Brady: A great deal of false economy is practiced in the office of the foundry. It is not with the practical molder or the practical foreman. I have been connected with foundries where they did all their buying in the office. Perhaps some young man gets into the office and he is put in the position of buyer. Somebody comes

along with iron that is 50 cents a ton cheaper. He will buy it and ring it in on the foreman. Perhaps he will try to pass it off as another brand, as another iron. The same is true with coke. I have had in my experience times when they would give me very inferior iron and coke and try to pass it off on me and argue the matter with me, when I knew and they knew that it wasn't the fact. They were giving me those cheap things and expected the same results.

Mr. A. Sorge, jr., then read the following paper:

"AN EXAMPLE OF COST SHEETS FOR FOUNDRIES."

In a recent article on foundry costs appearing in the issue of The Iron Age of September 5, 1895, I gave the main features of an analysis of foundry costs. My object in that article was to call attention to the necessity of logically dividing the indirect items of labor, material and expense in an equitable manner among the various classes of products. I did not multiply the reasons for such divisions on account of the lack of space, but a careful consideration of each individual item that enters into the total cost will readily indicate the proper division or proportioning of same according to the amounts of other previously determined quantities. It is necessary that we start a practical system of costs with one or two items of which accounts are kept accurately classified. Then it is generally possible and perfectly rational to divide other items, items, whose total only can be easily determined, among the various classes according to the proportion of one or the other of the accurately determined accounts. Perfect accuracy will not be the result of such a system, but as I stated in the article above referred to, such perfect accuracy can only be obtained by the use of a large clerical force to keep accurate class...ed account of each particular item, thereby involving such a large expense for bookkeeping that the same would more than outweigh any possible profit.

On the other hand, the inaccuracy introduced into the cost when the items have been proportioned on a logical basis, and the classification has been carefully determined so as to collect work of a similar character into each class, will be so slight as to become inappreciable.

Bearing in mind these general propositions I have prepared a set of forms which would be applicable to a foundry doing a varied lot of work. Naturally I do not expect that these particular forms will suit any particular person's case, but they will illustrate the system and the explanation of the routine followed will serve as a guide for any other work.

Starting with the classification, I have found it advisable to distinguish the classes not only by their description or names, but also by different colored blanks. There are eight classes, thus: Pulleys, pink; gears, lilac; boilers, etc., gray; band and fly wheels, green; engines, etc., blue; lifting plates, etc., red; brass, yellow; general castings, white. Each class is distinct in itself, although the classification in this case is arbitrary, owing to peculiar circumstances governing the methods of manufacture. However, these examples will serve to show the routine to be followed.

Each pattern as it comes from the pattern shop has one of these colored tickets attached to it, and the man receiving it receipts for it at the lower right hand corner. The ticket is the order for the molder and states the number of pieces required, a short description of the piece, its pattern number, the date of order and order number. Also a column is provided headed Cores, into which the number of cores is written, and it is stated whether stock cores or special cores. Also any instructions as to special quality of metal or special hurry of work, etc., are noted on the face of the ticket. At the same time a similar ticket of like color is attached to each special core box.

The molder's ticket goes into the foundry with the pattern, while the core ticket goes into the core room with the core box. Each day that the molder works on the special piece or pieces named on the ticket he fills out the columns ruled on the back of the ticket with the time spent, and also puts down the time spent by any other molder or helper who may be working with him. The core maker does the same thing with any special cores for which he may have received orders. Each evening all tickets of work on which progress has been made during the day are handed in to the clerk at the same time that the regular time check is deposited. The clerk posts this time each

Cores for

(FACE.) Description of Class. Color.
Order No..... Date ....

No. of pieces.	Description.	Pattern No.	
Wanted.		Core Box O. K. Enter time on back	

(BACK.) *Labor Account.*

Hours.										
Check No.										
Pieces Made.										
Date.										
Hours.										
Check No.										
Pieces Made.										
Date.										

Daily Product Sheet.

Cast on.....

Class.	Molder's Check No.	Order No.	No. of pieces	Description.	Pattern No.	Date Shipp'd	Weight.

Daily Record of Cupola No. —

Charges.	Sal-vage.	Old Wheels	Scrap			Total.	Coke.
1.....	.....	.....	.....	....	...	.....	.....
2	.....	....	.....	.....	.....	.. ....	.....
3.....	.....	.....	. ..	....	...	... ..	.....
Totals .	.....	....	.....	....	...	.....	.....

	No. of charge.	Transverse.	Tensile.
Test bar No. 1	.....	.....	.... ..
Test bar No. 2	....	.....	.....
Test bar No. 3	.....	.....	....

Flux..... Blast put on... Bottom dropped....
Ratio melted to Fuel used.....to....
..... Foreman,

evening into the proper column on the Daily Time Sheet. This is ruled first with a column for check number or name of workman, then with eight sets of nine columns each. The first six sets are for each day of the week and contain one column for each class of work and one for total time. Then there is a column for rate of pay per hour, and the seventh set of columns gives the total number of hours in the week given to each

(FACE.) *Description of Class.* Color.
Order No.... ... . Date.....

No. of pieces.	Description.	Pattern No	Core.
Wanted	for	Pattern O. K. Enter	time on back.

(BACK.) *Labor Account.*

Hours.								
Check number.								
Pieces made.								
Date.								
Hours.								
Check number								
Pieces made.								
Date.								

class by each man. The eighth set of columns contains the cash value of these total hours per week carried out in dollars and cents. As a line is provided for each man and his check number or name is written first therein, it takes very little time for the clerk to post in each day's work. The total hours posted each day must agree with the hours shown by the man's time check, thus giving a means of correcting errors. Besides this, the foreman looks over these tickets and is enabled to prevent wrong charges.

If all the work ordered on the ticket is completed the clerk keeps it, but if not, then he returns it next morning to the man from whom he received it. The tickets which he keeps are filed away together each day. But before filing or returning tickets

the clerk copies from them into the Daily Product Sheet all work that was completed that day, whether it finished up the order on the ticket or not. The headings of the columns of this sheet are: Molder's Check No., Order No., No. of Pieces, Description, Pattern No., Class, Date Shipped, and Weight, besides the general heading, giving the date when cast. The first six columns are filled out by the clerk, and the sheet then contains a full record of all the work reported cast in the foundry on that day. He hands this sheet to the foreman, who examines it and then passes it to the weighmaster in the cleaning room. The weighmaster must furnish an account of the weight and disposition made of each piece on the list by filling out the last two columns. Should any piece be defective he so notes on the sheet in place of the date of shipment. At the same time he makes out a new ticket for the foundry to make another piece and heads this ticket "Replace Order." This ticket is treated exactly like an original ticket. The weighmaster also keeps a book for bad or defective castings, in which he enters each day all the work that has been spoiled, giving description, pattern number, weight and class as well as date.

DAILY TIME SHEET from.....to.....

MONDAY. TUESDAY. WEDNESDAY, Etc.

Date..... Date..... Date..... Hours per week. Wages paid per week.

(NOTE—Only columns for Monday, Tuesday and Wednesday are given owing to lack of space.)

Check No.	Pink.	Lilac.	Gray.	Green.	Blue.	Red.	Yellow.	White.	Total.	Pink.	Lilac.	Gray.	Green.	Blue.	Red.	Yellow.	White.	Total.	Pink.	Lilac.	Gray.	Green.	Blue.	Red.	Yellow.	White.	Total.	Rate per hour.	Pink.	Lilac.	Gray.	Green.	Blue.	Red.	Yellow.	White.	Total per hour.

Pink.....Pulleys.
Lilac.....Gears.
Gray.....Boilers, Etc.
Green ....Band and Fly Wheels.
Blue.....Engines, Pumps, Etc.
Red .....Lifting Plates, Etc.
Yellow....Brass.
White ..General.

The time of all the men employed in cleaning castings is taken on a special sheet, which is like the Daily Time Sheet, only smaller and has a column added for weights. After a number of trials I found that the labor by classes averaged very closely according to the molder's time, and therefore only the total daily time of each man is taken. From the Daily Time sheet the relative proportions of molder's time in each class are readily determined and the clerk then divides the casting cleaners' time accordingly. The weights for each class are entered daily by the weighmaster.

The time of core makers and helpers is taken in the same way as the time of molders and helpers, namely, by tickets, when work has been done on special cores. Work on stock cores is reported to the clerk when the tickets are handed in, and makes up the balance of the day's work not shown on the tickets. Each day the foreman core maker reports the material consumed in his department during the day. All other labor around the foundry is simply posted in toto each day in the Daily Time Sheet. The storekeeper has a book in which he keeps

Labor. (FACE.) *Material.*

Total Cost of Labor Classified.

	Pink.	Lilac.	Gray.	Green.	Blue.	Red.	Yellow.	White.	Totals.
Molders.									
Core makers.									
Helpers.									
Cleaners.									
General labor									

Labor Cost per Pound of Good Castings.

	Pink.	Per ct.	Lilac.	Per ct.	Gray.	Per ct.	Green.	Per ct.	Blue.	Per ct.	Red.	Per ct.	Yellow.	Per ct.	White.	Per ct.
Molders.																
Core makers																
Helpers.																
Cleaners																
General labor																

General Labor Items.

	Molders.	Boys and apprentices	Core workers.	Boys and apprentices.	Helpers.	Cleaners.	Gen. Labor.	Sundries.
Number employed.								
Highest wages paid.								
Lowest wages paid.								
Average wages paid.								
Labor per lb. good cast								
Percentages of labor.								

Grade of Iron.	Rate.	Wgt.	Cost.	Grade of Iron.	Rate.	Wgt.	Cost.
				Total iron used.			
				Salvage, Etc.			
				Total iron melted.			
Foundry Supplies.				Coke used in c'pola			
				Core room supplies.			
Total.							
Grand total cost of materials and supplies.							

Total Material Costs Classified.

	Pink.	Lilac.	Gray.	Green.	Blue.	Red.	Yellow.	White.	
Materials.									
Foundry supplies.									
Core room supplies									

Material Costs per Pound Good Castings Classified.

	Pink.	Per ct.	Lilac.	Per ct.	Gray.	Per ct.	Green.	Per ct.	Blue.	Per ct.	Red.	Per ct.	Yellow.	Per ct.	White.	Per ct.
Materials.																
Foundry Supplies.																
Core room supplies																

Expense. BACK. *Castings Produced.*

Totals.

Name of Account.	Overtime Hours.	Total Hours.	Cost.	Class.	Description of class.	Good Castings. Lbs.	Bad Castings. Lbs.	Per cent. Bad to Total.
Power, heat and light.				Pink.	Pulleys.			
Superintendence and clerks.				Lilac.	Gears.			
Int. on and repairs of buildings.				Gray.	Boilers, Etc.			
Taxes and insurance.				Green.	Band and fly wheels.			
Shipping and cartage.				Blue.	Engines, Pumps, etc.			
Care of patterns.				Red.	Lifting plates, etc.			
				Yellow.	Brass.			
				White.	General.			
Sum total.				Totals.				

Total Expense Costs Classified.

Name of Account.	Pink.	Lilac.	Gray.	Green.	Blue.	Red.	Yellow.	White.

Total Cost of Castings per Pound Good Castings Classified.

Class.	Labor.	Material.	Expense.	Total.
Pink.				
Lilac.				
Gray.				
Green.				
Blue.				
Red.				
Yellow.				
White.				
Average.				

Expense Costs per Pound Good Castings Classified.

Name of account.	Pink.	Per ct.	Lilac.	Per ct.	Gray.	Per ct.	Green.	Per ct.	Blue.	Per ct.	Red.	Per ct.	Yellow.	Per ct.	White.	Per ct.

General Summary.

Total cost labor.			
Total cost material.			
Total cost expense.			
Grand Total.			

Fuel.

Cupola No. 1.		No. 2.		No. 3.		Average.	
Iron melted							
Fuel used							
Proportion							

separate accounts of the various materials of which he has charge. He notes all materials received and also all materials given out, and makes a balance of each account every four weeks, showing the amounts used. These amounts he reports to the clerk. Periodically an inventory is taken, so as to check up the storekeeper's accounts. All pig iron, coke, sand, slabs, flux, etc., are at once charged in proper accounts kept for this purpose by the clerk. There is an inventory taken of these materials each four weeks, the amounts used up being credited to the proper accounts. Each day the cupola tender hands in, for each cupola, detailed report of all materials consumed in the cupolas. These reports are made out on special blanks. Besides giving the detailed composition of charges, the various tests are entered on this sheet, and also the most important castings made, stating from which charge the iron was taken. At the end of each four weeks the totals consumed, as per daily cupola reports, are compared with the totals shown as consumed by the inventory, thus furnishing frequent checks on wrong weighing, etc.

In the general ledger of the foundry an account is kept headed Expenses. In this account are two divisions, one expenses proportioned to weights of castings and the other expenses proportioned to labor. Under expense proportioned to weight are charged all expenditures for shipping, cartage, care of and receiving patterns, a periodically determined amount for depreciation of plant and interest on same, and salesmen's salary and expenses. Under expense proportioned to labor are charged all expenditures for power, heat, light, superintendence, clerical help, interest and repairs to buildings, taxes, insurance, etc. The foregoing routine is followed daily and at the end of each four weeks a summary of all items is made under three general headings: Labor, Material and Expense.

Starting with labor, we divide according to its character into molders, core makers, helpers, cleaners and general labor. The first table under this head gives the total cost of labor classified. A line is provided for each kind of labor and columns ruled for the various classes of work. Into these columns are posted the total cash expenditures in each class for each kind of labor. The molders' labor is taken direct from the Daily Time Sheet, core makers' labor from their time sheet, the stock core labor having been divided in proportion to the directly ascertained amounts. The same is done with the labor of helpers and cleaners. The general labor having only been taken in toto for each day's work is divided among the classes according to the weight of castings produced in each class. These amounts are all summed up and the salaries of foreman and clerk are added. The total must agree with the total pay rolls during the four weeks. In the next table we determine the labor cost per pound of good castings, and enter these amounts in their proper place. A third table headed General Labor Items gives the following data for each class of labor: Number employed, highest, lowest, and average rate of wages, total labor cost per pound of good castings, and percentage of each class of labor compared to total labor. This completes the detailed summaries of labor.

The material is also summarized in detail. First a table is prepared giving each kind and weight of iron, scrap, steel, etc., used, and these amounts carried out in dollars and cents. The various amounts of salvage, sprues, gates, etc., used during the period are then added to the weight of iron melted. Below this is given the coke consumed in the cupola and its cash value; and following this the fuel used in core ovens, sand blacking, sea coal, flour, etc., and all other supplies used in the foundry, with the exception of the materials and supplies used in the core room, which are given separately. At the bottom of the page are two tables, one of which gives the materials and supplies in totals for each class of product, while the other gives these items divided per pound of good castings for each class.

Similarly the expenses are summarized in tables. The cost of power, light, and heat are kept by the clerk in an account and their total entered under the proper head in the table, which also gives the total number of hours that they were used and the number of hours overtime, if any. The clerk also keeps accounts with superintendence and clerical help, interest on and repairs of buildings, taxes and insurance, shipping and cartage, care of and receiving patterns, and depreciation of plant. The totals of

these accounts are posted in the table. Beyond this are given two tables giving total expenses divided into two classes; these amounts being determined according to the analysis given in my article in the Iron Age.

Finally a table is made showing the castings produced divided into two classes and giving amounts of both good and bad castings, and percentages of bad castings to total product in detail by classes as well as for the whole output. A general table giving the total cost per pound of each class of castings, obtained by adding together the amounts from the table of labor, material and expense, next follows, and this is succeeded by a general summary which gives items figured out for the total average per pound of good castings produced and also gives the total amounts of iron melted in each cupola or furnace, the fuel used for this purpose and the proportion between the two.

You will notice that this gives a very complete and accurate review of the work accomplished in the foundry, and although such a report may appear prolix, it does not involve a very great amount of labor, because the daily postings and weekly totals given in the Daily Time Sheets, together with the Daily Product Sheet and Bad Castings Book, already contain most of the necessary items in a partially condensed form. These reports are exceedingly valuable and frequently indicate possible economies and improvements.

In order to obtain the cost of any individual casting, the date when shipped is looked up, and from the Daily Product Sheet the date of the casting is determined. The molders' and core makers' tickets for this casting are taken from the file and the direct labor is determined from them, as well as the weight from the Daily Product Sheet. If the casting was made from the average mixture, then the cost of the melted iron is determined from the table giving costs of materials per pound of good castings produced. This is added to the cost of direct labor and to the sum are added the cost per pound for indirect labor, material and expense, multiplied by the weight of the casting. The final sum gives the actual cost of casting. It will be found that the indirect items of cost do not vary materially from one period to the next, and therefore these amounts taken from the period preceding that in which the casting was made will give very accurate results.

Mr. Ferguson: I would like to ask if after working that system, say, for a period of six months and taking stock at the end of that time he found any degree of accuracy relative both to the time and material consumed in that period? That is, I should judge there is a good deal depending on the molders giving in their time correctely on a job, and also, unless the system of taking care of and weighing all material were very good, is there not danger that the totals are incorrect?

Mr. Sorge: On the question of labor, there is a check every time the report is made, and in the course of using the system the check comes in through the individual costs that are continually called for. There is not a day that an individual cost of some kind for one particular piece is not called for, and therefore continual reference is made to these tickets, kept on file and checked back with former tickets for comparison. That is, the value of the system comes in the fact that you do not burden yourself with a great mass of bookkeeping for individual costs, but that the individual cost is obtainable at any moment by referring to the original files and with a very small amount of labor. The system really tends to correctly divide the labor which is not directly visible, which cannot be said to have been put right on that job. The time may be taken by these tickets or by a clerk going around, which is immaterial and does not affect the system really. Although I have found this system to work very acurately, at first I will confess for a month or two I had considerable trouble. After a while when numbers of comparisons had to be made, when we could pick out the individual piece, and a similar piece had been produced some time before, we got so that checks were made which gradually forced the molders into the correct method of giving in their time. As to the material, I thought I had covered that point. That is, that by the system which I have arranged of taking care of the material and of labeling it, as it were, etc., the labor of taking an inventory has been reduced to a very slight thing. I was able at any time to go into my yard and ascertain within half an hour, within a limit of certainty not exceeding 500 pounds, what iron I had in the yard.

I could at any half hour in the day, any day, go in and tell what I had there, and by that means and by following out a similar system in the stock room I was able to make these periodical inventories, which came at entirely irregular times—no notice given. Like any other system that is worth anything at all, and that produces results at all, continual watchfulness on the men who are carrying it out is involved. That is necessary, for no matter what the system you will get nothing automatically. Where you have a large number of individuals to deal with you have got to keep watch of the details and keep them in shape.

Mr. Ferguson: After giving that a trial for a certain period of time and making comparison with previous systems, was there any ultimate reduction in cost of the ultimate output; therefore, was there any gain in the system over any other system used previous to it?

Mr. Sorge: Yes, the gain was that we were able at any time to compare individual, actual, original records of costs on individual pieces. If a piece has been made in that foundry while this system is in vogue I can at any time go there and put my finger on it and tell you what that piece cost at that time, and I need not keep a lot of bookkeepers to do it.

Mr. Ferguson: I know of one instance where they undertook to keep the individual cost on every piece that was put out of the foundry; they were employing about 100 molders and made an average of 500 to 1,000 pieces a day. It took a clerical force to do it of about twelve men. I question whether it is any benefit in the cost system to know the cost of every individual piece. I think when you get your tonnage cost—that is, where the output is to exceed five tons a day—it is close enough.

Mr. Sorge: Let me give you an example. We had a case in point. An engine was being built and a part of that engine broke. The question was to get an estimate on replacing the piece. There had been a customary method of assuming a certain pound price in the value of those castings right through. In that case we went to work and examined individually the cost of every casting in that engine, and got the pound cost of each individual piece. We found that we had to raise our price on the cost of that piece 50 per. cent. beyond what we would have done if we had charged the ordinary pound price that we were in the habit of figuring those castings worth. There happened to be a period when there were 160 to 170 men all told in the foundry. There was one clerk in the office. He attended to the time keeping and to the cost keeping, together with the weighmaster's assistants, who attended to the weighing. These furnished every individual cost that I wanted at that time. But the value of the whole thing lies, in that system as in any other, in a continual series of checks by the man who has charge of it; and in calling for items and comparing them with previous items, so as to avoid getting into a rut.

The President: In case a casting is lost do you charge the cost of the lost casting to the cost of the succeeding good casting to get at the individual cost?

Mr. Sorge: That case occurs occasionally. Of course in the general results on which all the work is figured we find the indirect cost of these items per pound of good castings, based on the average loss. But in each individual case each ticket shows what has been lost and what has not been lost and therefore the percentage is shown on the ticket. When that percentage varies from the percentage shown by the average accounts you at once perceive that, and the total labor on all the pieces has gone in on the tickets. Good and bad castings in that case are figured in on the cost of the good casting. If you had five pieces to make and in producing those five you had to make seven castings because two were bad. Let us say that on each one of those castings there were six hours molder's time and four hours helper's time for the direct labor; now then you would have seven times six, which would be forty-two hours, of molder's time and twenty-eight hours of laborer's time divided over five castings, with the additional amount of the proportionate indirect labor. I can only emphasize this fact: The value of the system is that it simplifies bookkeeping, it avoids the necessity of individual bookkeeping, but at any moment gives an original record of every individual piece.

The President: Let it be supposed that there was produced in one year a casting in which there had been losses. These losses were divided over a number of individual castings. At a later time you are called on to make a proposition to produce that cast-

ing. If you went back to the first cost of the individual casting you would base your proposition for the reproduction of the casting at a price which would insure you against a similar loss which you had encountered in the first place in that individual casting.

Mr. Sorge: I consider that is the only safe way you can do it. A foundryman can't afford to take his chances on castings; it is the men who buy them that have to do it.

The President: He may have lost the first casting in the first place by reason of inadequate facilities, and he may have proper facilities at the reproduction.

Mr. Sorge: That may be true, but I think that would be only an individual case. If the whole foundry had been reconstructed and improved so as to avoid the danger of losses which occurred before that matter would be taken into account. But this furnishes what it did actually cost. All you can afford to do is to sell it for that. You can't sell it for less and be sure of it.

E. E. Hanna: I would like to ask how much of the superintendent's time it took to check up these costs and whether that time could not have been better expended pushing the work? Would it not be better to have a man to keep these costs, make that his business, instead of making it the superintendent's business? I can see the use of the system; it simply brings down to the details of a machine or piece of work which we absolutely must have for the aggregate, for the complete machine. Every single detail of the machine we must have the exact cost of, just as much as we should have the exact cost of the complete machine. Another thing. As I understand it, the original daily tickets of the molder are kept. Now that seems to involve an extra storehouse for the paper. Would it not be better to have a man transcribe those, to take off the actual cost of each piece as it is made, and post it in a book under the heading of each piece where it can be immediately turned to and found so much quicker than by going over it again when you want to find it, as we always do on any machine in the aggregate? When we build a machine the first thing to know is what is its cost. We find the cost, then put in down in black and white and we can get at it immediately. Why not do the same way with the individual small piece, and after you have taken the cost from the slips burn them up, get rid of them?

Mr. Sorge: I think in regard to that I made the very point in the first paragraph of my paper: "As I stated in the article above referred to, such perfect accuracy can only be attained by the use of a large clerical force to keep accurate classified account of each particular item, thereby involving such a large expense for bookkeeping that the same would more than outweigh any possible profit." Now, to start with, of course superintendents didn't keep these costs, but checked them up by calling for individual costs from the clerk, the foreman of the foundry checking up the tickets every evening, or in the morning, which requires very little time. The superintendent does not depend so much on that as upon the fact that he can call for the individual cost of a certain piece and get the full record. He can then call for the individual cost of a smaller piece ,as nearly as he can find it, or perhaps exactly the same thing, which had been made at a previous period, and then by comparison can very readily check off whether any gross error had been made. It does not take a very long time till the costs for comparison are handed in. If something is wrong they were either wrong before or they are wrong now, and the superintendent can then insist upon knowing which was wrong. Like any other system, it takes time. A series of results must be obtained for the sake of comparison. Now with regard to posting the records in a book. That would be a case where extra labor is expended which would not give a return. The records of about eight months with about 170 men took up a space of about 16 inches square and 2 feet long, but arranged with a series of cardboards with the dates on them. This puts them in the shape of a file, which can be referred to in almost an instant. The saving of the space which this box might occupy for a year would not repay for the clerk employed in copying the records into a book.

J. H. Dalton: In a great many foundries work is taken by the job number. A very good system for keeping track of that job is to allow the time keeper to go through the shop just before blast time, and charge

the helpers', molders' and core makers' time to the job number. Have a ticket put on the patterns so that the molder can tell what job it is. Suppose the contract calls for the building of an engine, or putting up a structure. That goes under the head of one job number, and all castings in that job are charged to it. In that way, when the job is completed the cost can be very accurately ascertained. The cost of the individual casting is arrived at by putting the pattern number on the check, and referring to it in that way.

E. E. Hanna: The idea of sending a man through the shop to take up time comes pretty near not being a system. That man is liable to die or he may leave. From past experience I know what it is to start in with a new time keeper. Now Mr. Sorge's system depends on the men who are with you and are likely to stay. There is a routine about the system that everybody can pick up, or should be able to pick up. I never found a new time keeper who could learn our methods of doing our work in one month. Often it takes six months. Shop costs suffer during that time. The main thing is to get a system that anybody can pick up and take hold of, that the men who expect to stay with you have an interest in and push along. The work is divided up so that if one man slips up there are three or five more men there for the time being.

W. N. Moore: There must be in all systems what there is in this, if I understand it correctly, a check on the pay roll, and the time and labor account. If we spend a dollar in the pay roll, every penny of that must be accounted for and charged against something; that is an indispensible element in any cost sheet which is of any value. There are various ways of getting at it, but they must be present in every cost sheet that covers the ground. When a dollar is expended for labor, or a dollar expended for material, it must be charged against something. The general expense necessary in all factories and foundries—that general expense account must be kept down to the smallest amount possible. The skill of the management must be relied upon to supply some of the deficiencies which the system does not supply when the information will cost more than it is worth. I don't know that any cost system was ever devised that would enable an officer to determine to the hundredth part of a cent what the absolute cost was, and neither do I consider it necessary. But it should determine the cost practically, and within a very small fraction.

WEDNESDAY AFTERNOON.

At 2 o'clock the association proceeded in a body to Schwab & Sercomb's foundry, where they spent some time in observing the methods pursued in molding rolls for the Illinois Steel Company, parts of hot air furnaces and miscellaneous castings. The firm are manufacturers of the Gilt Edge hot air furnaces, as well as wood burning furnaces for heating purposes. The members next proceeded to the great shops of the Edward P. Allis Company, manufacturers of Reynolds Corliss engines, flour mill machinery, etc. They were piloted through the foundry by Superintendent Joseph Harrison, who took great pleasure in exhibiting his fine equipment and in describing the character of the work done. The main foundry building has no less than four electric traveling cranes mounted on the runway covering the central portion of the building, while eight power jib cranes are ranged along the side. The great molding floor was crowded with workmen, the company being driven to their utmost capacity to complete orders which they have in hand. The loam molding department excited much interest. A force of twenty-five men is kept constantly employed here in building the brick work for making large castings. One of the cupolas was running on semi-steel, to be used in making chilled rolls for flour mills. A particularly noticeable point about these works is the systematic manner in which the yard is arranged, everything is kept in perfect order.

After gathering in a group to be photographed, the visitors embarked on electric street cars for a trolley ride round the city. For an hour and a half they were conveyed by this pleasant means of transportation through all sections of the city and into some of the suburbs, obtaining in that short time a better conception of Milwaukee's greatness, as well as its beauties, than would otherwise have been acquired in days. For this, as well as other courtesies, they were indebted to the Milwaukee foundrymen.

THE BANQUET.

At 8 p. m. the association gathered round

13—H. M. Lane
14—M. N. MacLaren, Jr.
15—S. Shaw
16—John G. Coleman
17—Chas. A. Sercomb
18—John M. Sweeney
19—W. N. Moore
20—S. T. Johnston
21—E. E. Hanna

12—J. A. Penton
11—Wm. M. Wilson
10—John Meehan
9—E. J. Welch
8—Wm. Ferguson
7—James Fyfe
6—Capt. I. M. Bean
5—B. T. Bacon
4—A. T. Whiting
3—A. Shillo
2—Joseph Harrison
1—Joseph Dalton

46—John Pettigrew
47—O. J. Colton
48—W. Meyer
49—Geo. D. Sheriffs
50—John T. Llewellyn

45—J. T. Rowlands
E. D. Webber—51
44—R. A. Cook
A. J. Bayley—52
43—John Davis
F. M. Lyon—53
42—Wm. Gebb
H. G. Saecker—54
41—W. C. Waterbury
T. B. Walsh—55
40—R. F. Palmer
39—C. A. Haertel
38—Chas. G. Deismer
37—H. F. Frohman
36—O. W. Greenslade
35—John Greenslade

Geo. W. Cope—22
A. Sorge, Jr—23
J. K. MacKenzie—24
H. S. Vrooman—25
J. A. Brady—26
R. J. Cleveland—27
Jas. S. Winn—28
J. J. Thompson—29
W. R. Warner—30
L. W. Lukens—31
H. L. Hotchkiss—32
J. L. Monahan—33
T. J. Neacy—34

DIAGRAM OF BANQUET TABLE.

the festive board at the Plankinton Hotel for their annual banquet. The daily tonnage of gray iron castings represented on this occasion was 1,000 tons. The total daily melt of all kinds, including the steel works represented, would probably be 4,000 tons.

After the very excellent repast had been disposed of President Sweeney rapped for order and in a very happy speech prepared those present for the intellectual good things that were to follow.

Being well acquainted with those present he was able to introduce the various speakers in a way that interested and amused those present by always making some happy personal or suggestive reference to each one.

The Arlington Male Quartette, one of Milwaukee's finest musical organizations, rendered a large number of choice selections during the evening.

Mr. Sercomb was first called upon, and among other things, told his hearers that he was the son of Milwaukee's, if not of Wisconsin's pioneer foundryman. He was followed by Geo. W. Cope, of the Iron Age, W. N. Moore, S. T. Johnston, A. Sorge, Jr., John A. Penton, Joseph Harrison, E. E. Hanna, M. N. Maclaren, Jr., H. S. Vrooman, John Pettigrew, B. T. Bacon and James Fyfe.

THURSDAY MORNING.

An early start was made for a trip to Bay View, to visit the blast furnaces and rolling mills of the Illinois Steel Company, on the invitation of Pickands, Brown & Co., sales agents. The foundrymen were met at the entrance to the works by Superintendent Geo. L. Reis and Auditor Price, who escorted them to the blast furnaces. A cast was made almost immediately after the visitors had arrived and had inspected the arrangement of the pig bed. They were then taken through the rolling mills, witnessed the work of the various trains rolling light rails, heavy shafting, merchant bar iron, 1-4-inch round iron, etc., bringing up in the pig iron shipping yard, where they saw the method of breaking and grading iron. A formal vote of thanks was given to the Illinois Steel Company and Pickands, Brown & Co. for their many courtesies.

The Filer & Stowell Company's works were next visited. They found this a well appointed establishment for the manufacture of engines and other heavy machinery. In the foundry a 24-ton pillow block, which had been cast for an engine for the Illinois Steel Company, attracted much attention. Although just taken out of the sand it was clean and flawless, and veteran foundrymen regarded it with as much admiration as the average man would bestow upon a monument.

The Hoffman & Billings Mnfg. Company's plant was then invaded. They are manufactures of plumbers' goods, comprising cast iron soil pipe, brass and iron fittings, valves, etc. The company were also manufacturers of engines, but abandoned that class of work some three months since to concentrate their energy on plumbing specialties. Their brass foundry is one of the largest in the West, containing twenty-four furnaces, and melting 6,000 pounds of copper daily, almost entirely ingot copper, very little scrap being used. The core room for the brass foundry was inspected with much interest on account of the delicate work done for small brass castings. The soil pipe foundry came in for much commendation, with its appearance of neatness and decided system. The machine molds were critically examined.

A short walk brought the visitors to the foundry of Wm. Bayley & Sons Company, manufacturers of heavy machinery castings. These works are comparatively new, succeeding the foundry destroyed in the great fire of October 28, 1892. The new plant, however, has been built in another part of the city from the former location to secure greater space. The foundry is equipped with two electric traveling cranes on the runway through the center of the building and another is shortly to be installed to run on the side, when all portions of the building will then be covered in this manner. The company are now very busy on ice making machinery for the Vilter Company. They furnished the visitors a souvenir of the occasion in the form of a book of photogravures of the Milwaukee fire of 1892, together with an artistic penwiper. Before leaving this plant a meeting of the association was held at which a vote of thanks was given to C. A. Sercomb and the other Milwaukee foundrymen for their assiduous devotion to the entertainment of the visiting members. This ended the official visitation by the association. Some of the

members called to see the works of the Nordberg Mnfg. Company, buliders of engines, but the majority made preparations to travel homeward.

Incidentals.

C. A. Sercomb's speech at the banquet was a gem, and rather took even his best friends by surprise.

The weather was as warm and exhilarating as President Sweeney's smile when he saw how satisfied and pleased everyone present appeared to be.

Geo. W. Cope, of the Iron Age, was as numerous as ever, and gave the foundrymen present at the banquet some good practical pointers in a speech that was one of the best of the evening.

H. S. Vrooman, of the Garden City Sand Co., presented each of those present with a souvenir of the occasion in the shape of a neat vest pocket memorandum book with gilt edges, appropriately inscribed.

L. W. Lukens, of the Illinois Malleable Iron Co., H. L. Hotchkiss, of the Deering Harvester So., and John K. McKenzie, of Dickman & McKenzie, were the chemists present.

H. M. Lane, of the Lane & Bodley Co., Cincinnati, came a long way to the meeting, but he seemed glad to be there, and the officers of the association appreciated the compliment thus paid them.

The Racine delegation was a large one and consisted of nine members, every one of them with one exception being practical foundrymen and the most of them foremen.

L. D. Rosenheimer, of the Milwaukee Malleable Iron Co., deserves especial mention for his untiring efforts to make the meeting a success and have everyone feel at home.

A. J. Bayley and E. Weber represented Wm. Bayley & Sons. Theirs is one of the most modern and complete foundries in the West, and was visited and much admired by all who saw it.

The banquet at the Plankinton was pronounced by those present best qualified to express an opinion as being most excellent, both as regards quality, quantity and service.

The position taken by E. E. Hanna, of the Gates Iron Works, on the subject of night work was original, and created some discussion both in and out of the meeting. His opinion that nothing was made by it seemed to have no seconders.

W. N. Moore is president of the Joliet Stove Works, Joliet, but that does not prevent him from showing up regularly at all meetings. He is evidently a close observer and his remarks show him to be well informed on foundry subjects.

Pig iron men in these days are regarded as well satisfied and contented as any set of men have reason to be, and this probably accounts for the liberality with which they entertained their friends in Milwaukee.

Conspicuous in this respect were B. F. Bacon and James Fyfe, of Pickands, Brown & Co.

A. Sorge, Jr., was submitted to considerable of a cross-fire concerning his paper on foundry costs, but it was noticeable that when he got through answering questions those present either appeared satisfied or were so. Mr. Sorge is a great believer in system.

It is too bad that E. J. Welsh, of the Weir & Craig Manufacturing Co., and John Meehan, formerly with the Lake Shore Foundry, are such inseparable friends and look so much alike. They are constantly being mistaken for each other. They should wear a tag.

C. A. Sercomb was in his element and the hero of the hour. It was rumored that much if not most of the work done in Milwaukee by way of preparation for the meeting was done by him, and he certainly merited the thanks of all present for much of the pleasure they enjoyed.

The trip across Lake Michigan was a most charming one and with one exception was enjoyed by all. The exception was a popular member of the party whose temporary indisposition came nearly having a serious ending, and who might have been lost in Lake Michigan but for the presence of mind of his roommate.

Joseph Harrison, of the E. P. Allis Co., John Pettigrew, of the Joliet Steel Works, and William Ferguson, of the Gates Iron Works, made a conspicuous group on several occasions. It would be difficult to get

three more prominent, practical or better known foundry men together anywhere.

Mr. William N. Wilson, who looks after the interests of the Cleveland Facing Mills in several of the Western States, seemed to have quite a coterie of friends who were glad to see him. Mr. Wilson has a quiet, straightforward way that wins confidence, and without that great essential no business man is a success these days.

The genial, good-natured countenance of A. T. Whiting, of the Whiting Foundry Equipment Co., was conspicuous everywhere, and those who had never previously met him as well as his many friends, will long remember his cordial hospitality in room 538. The cigars, etc., especially the latter, were said to be par excellence.

Wherever any number of foundrymen are gathered together there will be found a representative of the Obermeyer Co. always doing their best to entertain and make more pleasant the occasion. In this instance they were represented by H. F. Frohman, whose room on the boat became immediately a favorite resort. Among other things distributed was a neat aluminum match safe, covered with leather, which will doubtless be long preserved and valued by the recipients.

The following is the menu of the banquet. the quaint application of a number of foundry terms to a bill of fare originated in the fertile brain of H. S. Vrooman and created considerable amusement:

MENU.

Tap out
Green Turtle, Bull Ladle
Sliced Tomatoes Sliced Cucumbers
Broiled Whitefish, a la Manganese
Potatoes Graphite
Larded Filet of Beef, with Combined Carbon
Scrap Potatoes Brown
Sulphur Punch Roman
Roast Teal Duck, Stuffed with Pig Iron
Green Sand Peas
Chicken Salad, Silicon Sauce
72 Hour Cake Plumbago Ice Cream
Fruit in Flask
Cheese, Tested a la Transverse
Chill Crack-ers Coffee, Melted at 14 to 1
Drop the Bottom

Books, Exchanges and Catalogues.

W. A. Jones, of the W. A. Jones Foundry Co., Chicago, will soon be known for and wide as a great pulley manufacturer. Starting in a few years ago in a small way, his business has grown to mammoth proportions along the line of pulleys, hangers, etc., and by paying especial attention to "hurry-up" jobs, he has succeeded in building up a large trade.

He has recently published a seventy-five-page catalogue, containing much valuable information on the subject of pulleys, shears, hangers, pillar blocks, etc. This book is one that everyone interested in power transmission will find invaluable.

The Millett Core Oven So., Brightwood, Mass., have issued a neat 16-page catalogue that tells all about their famous core oven, and besides gives the opinion a great many of its users have of it, these opinions taking the form of flattering letters.

The Sherry Torch Co., Rochester, N. Y., have mailed us their catalogue, which contains some important descriptive matter concerning their light.

Postponed.

The meeting called under the auspices of the Philadelphia Foundrymen's Association for the purpose of forming a National Association, and which was to have convened in Philadelphia November 20, 21 and 22, has been postponed until early next year for several reasons, chief among them being the fact that it was expected a great many Philadelphia foundrymen would be in Atlanta on Pennsylvania day, November 14th, and might not return in time, and the National Association of Manufacturers would meet in Chicago November 19th.

Re-Organized

The Tabor Mfg. Company of New York, builders of automatic foundry molding machines, have recently been reorganized with the following officers: Harris Tabor, president; Angus Sinclair, vice-president; E. H. Mumford, secretary and treasurer. The office is at 39 Cortlandt street, New York. New life has been given to the introduction of power molding machines for foundry work, in which foundrymen are showing great interest, and the company feel sure of greater success for themselves and for their machines than ever before.

A TECHNICAL JOURNAL DEVOTED TO FOUNDRY INTERESTS.

THE FOUNDRY

Published Monthly by

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DETROIT, MICH.

JOHN A. PENTON,

EDITOR AND PROPRIETOR.

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THE FOUNDRY is issued promptly on the 20th. of each month, and will spare no endeavor to furnish valuable news and information to those interested professionally or incidentally in molding, melting, mixing of metals, foundry management, etc. Persons connected with any of these lines of industry will confer a favor upon the Editor of this Journal by sending him news from their section of the country pertaining to the foundry interests, particularly individual theories and experiences of practical value.

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Trade Outlook.

The rapid improvement in all kinds of iron and steel business that characterized the summer months seems to have come to an end, and the amount of iron being melted would appear to be about the same as thirty days ago. There is some evidence of improvement in car shops and a prospect that some good orders for rolling stock may be placed in the near future.

Foundries that make a specialty of blast furnace and rolling mill work appear to be getting their share just now, while along the line of cast iron heating apparatus of all kinds they are busier than for several seasons. This refers to radiators, hot air furnaces, hot water heaters and stoves.

The unusually high freight rates ruling on the lakes this season is expected to stimulate some ship building, and this will give the marine shops some business, which they are badly in need of if they expect to equal their output for the few years immediately preceding the panic. In jobbing and architectural shops there is not so much doing as thirty days ago. The builders of Corliss engines and machinery tools report a good fall trade. Pig iron has been on the whole stationary and devoid of sensational features during the past month.

Buyers have not been as plentiful as they were and then the orders have been in small lots. Everybody is waiting, the buyer until the market drops, and the furnace men until the present stocks in foundry yards are used up. It seems evident that the furnacemen have the best of it, as a great many of them are sold up to the first of the year and some beyond, while those who are not take advantage of the general situation.

Coke has advanced nicely and the price seems likely to be maintained for some time. The increase carried with a raise of wages to the thousands of coke producers, but also left an increased margin to the owners of the ovens.

In foundry supplies business has been unusually good. There is not the amount of cut-throat competition there was a year ago, and the "facing men" are no longer so content to do business for their health or philanthropic motives.

The wages question has been aired a trifle in the Eastern States, and the employes in the foundries of Boston and Lynn, Mass.,

have secured an increase of ten per cent after a short struggle, and there are evidences that other cities may be called upon to follow suit.

No Apology Needed.

As an excuse for devoting so much of our space in this issue to the proceedings of the Western Foundrymen's Association, we have only to offer a statement that the material was, taken as a whole, first-class, and it would be difficult to secure matter more suitable for our columns or more interesting to our readers. In addition it has the added charm of being a recital of what was said and done at a meeting of one of our great foundrymen's associations. Foundrymen, generally, everywhere are beginning to feel as if these associations should be encouraged, and are showing a greater measure of interest in what they do.

A Valuable Contribution.

Mr. Sorge's paper on the subject of "Costs," appearing elsewhere, should not only be read carefully, but closely scrutinized by every foundryman, excepting, perhops, those ambitionless mortals who never look further ahead than sunset.

The criticism that has before been made by that it was overcomplicated has been more than met by Mr. Sorge's statement, that it was not, of course, applicable to every foundry, but that the idea of systematizing cost accounts was.

The plan outlined by him would not, perhaps, be the ideal one for more than one hundred out of the forty-five hundred foundries of the United States, but it represented a nearly perfect and easily understood system for a large, first-class American foundry doing a general run of machinery manufacturing or jobbing work, and even then local circumstances might suggest variations in nearly all.

The matter of systematizing methods of production in manufacturing plants has received much attention during the past few years, and it is to be hoped that Mr. Sorge will not stop the work in which he has made a name for himself and in which he is an undoubted authority; but that he will let the foundry world hear from him frequently.

That the adoption of such a system is almost a necessity and sure to pay a large dividend on the small expense entailed, is a fact no one will question, and Mr. Sorge is deserving of much credit for giving us an insight into it to the extent he has.

A Little Advertisement.

We do not desire to use our editorial columns for advertising purposes, but for all that we will deviate sufficiently from our custom in that matter to advise our readers that The Foundry Supply Co., of Boston, Mass., are still doing business at the old stand. They do not appear to be at all disconcerted because of existing rumors concerning their integrity, and the mere fact that a number of creditors find it impossible to get anything on account does not prevent them from keeping on in the even tenor of their way. We do not, however, suppose they get very much to do, as it is quite likely they are equally as honest with customers as with those from whom they attempt to get material.

Seriously, however, and in the interest of honorable business methods, it seems to us that self-respecting foundrymen should think twice before patronizing a concern who have shown themselves to be so devoid of a conscience.

The Scrap Heap.

There are two live, aggressive Foundrymen's Associations in this country, and prospects of more.

The first was formed a few years ago in Philadelphia. A good many people regarded it as an experiment and a visionary scheme at that time, and all sorts of motives other than the right ones were suggested by a few dyspeptic critics as being behind this movement.

* * *

As time went on, however, and it became apparent that the officers were exerting themselves most unselfishly and unsparingly for the common good, when it became patent to everyone that much valuable information was being brought to the surface, these pessemists were no longer heard, and a good many of them even applied for membership.

* * *

It must be conceded, of course, that it was largely a matter of experiment at first, there had never been anything exactly of

that kind before, and just what to do to secure and retain the interest of its members was something of a problem.

* * *

Each successive question arising, however, has been promptly and satisfactorily met, with the result that looking backwards over a period of four years, those who were instrumental in forming this association have much cause for self-congratulation.

What is true of the Philadelphia association applies with equal or almost equal force to the Western, they having this advantage only, that they were not the pioneers, and much had already been done to popularize the idea.

* * *

As a result of the work done by these associations, more attention has been given foundry matters during the past three or four years than, perhaps, during the last decade, if not during fifty years, and evidences of this work are apparent everywhere.

* * *

Ask those who have been constant in their attendance at any of their meetings (and no others are competent to judge), their opinion of the usefulness of the movement, and a disinterested observer would be surprised at the unanimity of the ideas expressed, if indeed they were not more or less enthusiastic.

* * *

And now comes the movement for a National Association, headed and championed naturally by those who first suggested the idea of foundrymen forming local associations, and just as naturally do we find a class of pessimists who want to know what good can be accomplished by putting the idea into immediate action.

* * *

These gentlemen are always in evidence. All reforms, improvements and advances made have to contend with more or less objection and criticsim, and no one should find fault that it is so in this case. It will make the movement stronger and its members and officers more watchful that no opportunity is afforded those whose horizon is limited to a narrow boundary to cast any reflections.

Several things are sure in this connection. The first one is that few industries offer more opportunity for the improvement likely to result from discussing its methods. Second, few need it as badly, and that those who are willing, without possibility of reward, to give their time and the result of, perhaps, years of study to help in this much-needed movement are deserving of not only praise, but gratitude at the hands of every foundryman on earth.

* * *

The Foundry is willing to believe and say, that those who have already done much in this way are capable of seeing it through to a finish; and more, that any foundryman who does not wish such a move prosperity ought to seek the advice of some competent physician without loss of time.

Krank's Korner.

The ownership of knowledge rests at all times with its possessor, no matter under what conditions it may have been gathered. There is no process by which its holder can be deprived of it, no law that will compel its divulgence, and no injunction that will prevent it from being transferred.

* * * *

Knowledge was never intended to be held under the absolute control of anyone, and no gain pecuniary or otherwise has attended any attempt to confine it. An all wise Creator has justly decreed that when knowledge is once liberated, it can never again revert as the sole property of its originator.

* * * *

For the advancement of human intelligence it is found necessary to record the experiences of the past. Not only success, but failure also is shown up as a warning to coming generations not to repeat it. The result of man's labor inscribed on the pages of history furnishes a bridge over which we may pass safely and quickly without wasting too much of our short lives in obtaining results already reached by our predecessors.

* * * *

The public will has decreed that anything in which tht public or part of it is intrusted may be discussed and described. It grants

the exclusive right to apply knowledge for a stated period for the benefit of its originator in the form of a patent only on the condition that the extent of his invention is at once made public and reverts to it permanently upon the expiration of his patent.

* * * *

Knowledge on which a patent can be secured is not what men try their best to conceal from daylight. It is information and experience, to which no protection can or should be extended, that they are the most anxious to keep locked up for their own use, and when a little of it leaks out through the keyhole, what a face they do make.

* * * *

It is one of the most difficult tasks to convince a man that others can have any interest in his doings or the least shade of right to discuss his business and methods without his consent if he is inclined to look at this matter in an opposite direction, and it is not made easier by the fact that it can never be defined beforehand where the interests of tht public demand access and the privacy of the individual ends.

* * * *

Knowledge is a difficult element to corner, and this is well, or else its price would be advanced beyond our reach. Mechanics are as a rule encouraged to gather all they can, but it sometimes happens that they are asked upon leaving one establishment for another one to return whatever information they may have collected, and enjoined from disclosing it to others. They are requested to forget that they ever learned anything, and what a beautiful thing it is that they can not be complied with, that it is not possible to give back knowledge.

Information is occasionally given away. To a small part of this earth's constituency this appears as a crime to be ranked next to high treason. We are not surprised that there are a few people left whose brains run on a narrow guage track, who would want to hoard knowledge as a miser hoards gold and gloats over it.

* * * *

We believe that the man who devotes his existence upon this planet to selfish interests and gain fails in fulfilling any noble purpose. We can not conceive of anyone being benefited by hoarding knowledge of a mechanical nature; yet a certain number seem intent upon rounding up all the useful information possible and corralling it; these are the people who are coughing up blood whenever a stray maverick of an idea is shanghaied away from them.

* * * *

When Abraham Darby, with the assistance of his apprentice, John Thomas, succeeded in the early part of the eighteenth century in casting an iron pot, it is recorded (The Iron Founder Supplement. Bolland) that they kept the reason of their success secret. We believe a good many foundrymen would to-day follow their example if they could, and yet we are unable to concede that Messrs. Darby and Thomas benefited themselves, their trade, or anybody else by concealing their discovery. We think the names of Darby and Thomas would possess an even greater luster, that they would have been still more successful financially and otherwise had they chosen to acquaint the world with the result of their labor.

* * * *

What regard would we have for Newton if he had carried the rewards of his life's study to the grave with him? Would the world have been benefited if Gutenberg and his associates had succeeded in keeping the art of printing a secret? Will humanity applaud anyone for refusing to leave this world better than they found it?

* * * *

We can not believe that human progress has ever been promoted by keeping experience in the background for one's own pecuniary gain, and we cannot call anyone a friend of civilization who intimidates and obstructs the path of those in search of knowledge.

A movement is on foot to organize a Foundrymen's Association in the New England States. A committee has been appointed to draft by-laws, and it is expected to complete the organization in the very near future.

The Center Blast Cupola.

The oft-repeated statement concerning the comparative small number of improvements mad e in foundry methods may or may not be true. Those who assert it, however, should bear in mind that while the number of mechanical principles involved are perhaps as many as in kindred occupations, yet the methods of applying these principles are of necessity such that improvements on a large scale are not possible. For instance, the proportionate amount of work handled or made entirely by machinery is infinitely small in the foundry compared to the machine shop.

The materials used and the output are of a cruder nature, and to a greater extent are the direct result of manual labor. The machinist can start a cut on a piece of shafting, a large pulley or planer job, and take a rest while the machine does the work. So much for improved machinery. In the foundry, from the very nature of the business, the molder has to keep pounding away now as ten, twenty or fifty years ago.

This, however, renders a... ...e more valuable any improvements possible, and by way of contrast, they become more appreciated.

The center blast cupola is not an entirely new thing. In 1867 it was in use, and various foundrymen have at various times since then experimented with it, all claiming results more or less in advance of those received from the old style, where the blast was introduced exclusively through the shell.

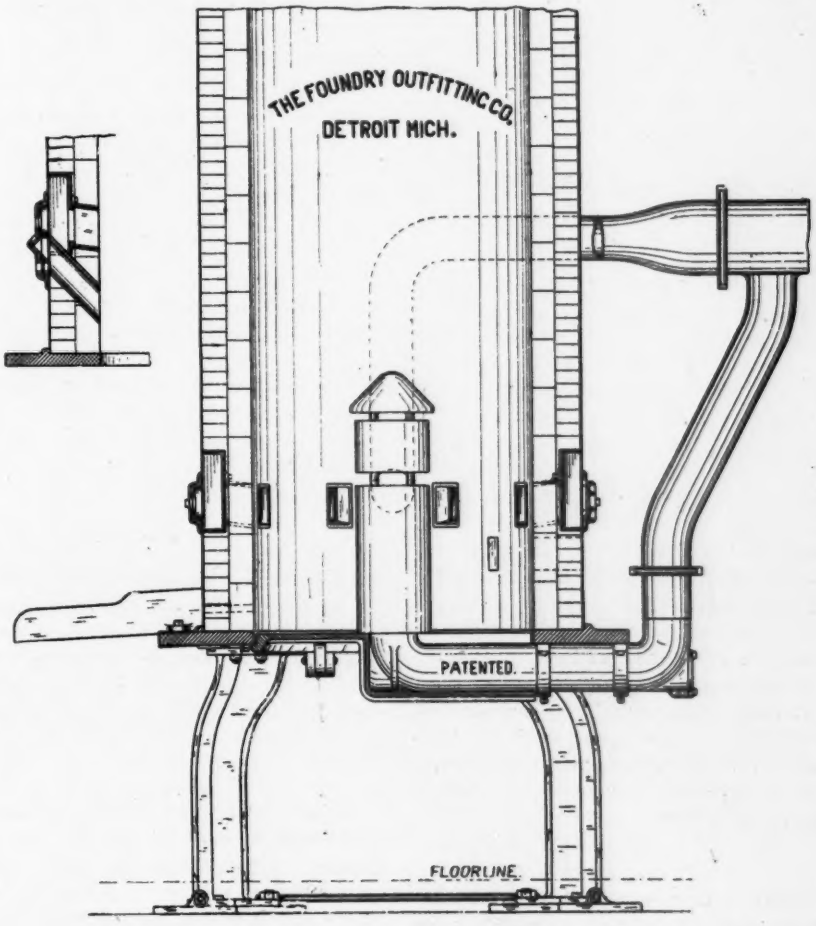


Fig. 1.

The idea, though a conceded good one, has never been extensively used, owing, largely, to defects in methods of application. Recently, however, Charles Johnson, superintendent of the Howe Scale Co., Rutland, Vt., has received letters patent on a method of introducing the blast into the cupola through the bottom in a way that it is claimed gives the greatest satisfaction and is free from the objections previously raised.

Our illustration, Fig. 1, shows clearly how this is accomplished: the blast being conducted from the blast pipe by a branch passing down the side, under and through the bottom at the center, up and out through the center tuyere.

Another pipe conducts a portion of the blast through two openings in opposite side of shell into an inside air chamber, from which it reaches the cupola by any desired number of tuyeres.

The center tuyere is composed of a number of cast iron sections, cast with small prickers to hold the fire proof material that must of necessity be renewed from time to time. These sections are held in place by three wrought iron pins over which they slip readily, thus rendering it an easy matter to take them off or place them on. These pins can be so arranged as to easily regulate the blast of center tuyere.

In our illustration, Fig. 1, it will be noticed that the bottom is so constructed as to lap about the lower blast pipe, although other methods can be used, we believe, for taking it into the cupola.

Fig. 2 shows plan giving another view of arrangement of hinges.

We believe that the tuyere has been in successful operation for eighteen months past in several large and well-known foundries, in one of which they state they can melt 20 tons in a 56-inch cupola in one hour, the iron at the end of the heat being equally as hot as at any time, and all of it hot enough to pour stove plate.

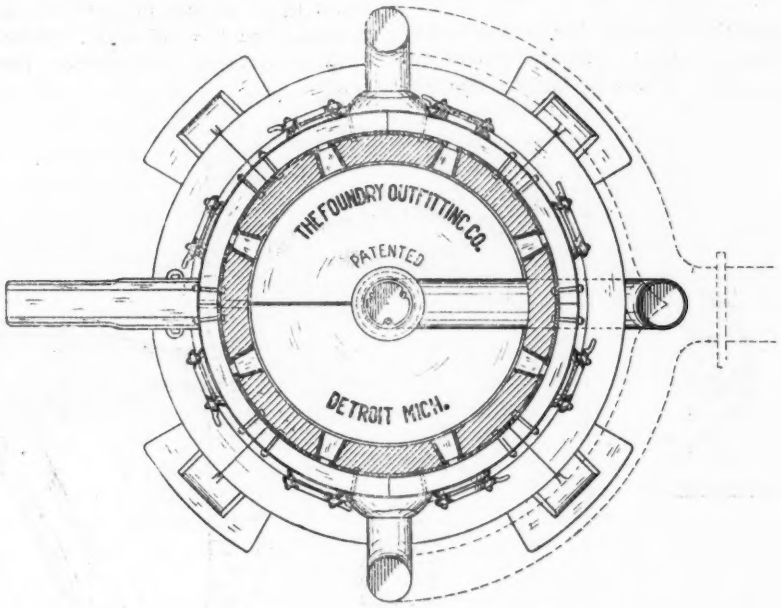


Fig. 2.

It is also claimed, we believe, that it can readily be adapted to any cupola now in use of any other style, without making any change except in the drop doors.

Mr. Johnson, the patentee, writing on this subject, has said:

"The aim of foundrymen and melters is to obtain the iron as hot as required for their castings with as little fuel as possible. Theoretically speaking, one pound of fuel in a cupola should melt 34 pounds of iron. That is, if the carbon in a pound of fuel were to receive sufficient oxygen to effect a perfect

combustion. It is safe to say that about four-fifths of the heat in the fuel goes to waste in unconsumed carbon. It will thus be seen that a large space in the center of the cupola does not get up to the melting point, and not having sufficient oxygen to produce carbonic acid gas, carbonic oxide gas is formed, which passes up through the cupola and goes to waste. This is seen by the fact that when the gas reaches the charging doors and receives a sufficient amount of oxygen it will flash into flame. Large quantities of gas pass through the fuel in this manner and are wasted.

"To obviate this waste and introduce air or oxygen into the center of the cupola to combine with the heated fuel and raise the temperature high enough to melt cast iron, the center blast tuyere was invented by the writer.

"The object of the invention is to provide a center tuyere, comparatively simple and durable in construction, and arranged to force air to the center of the charge, as well as to the sides; so that the whole interior of the cupola is formed into a melting zone to insure complete combustion, thereby pre venting gasses from going to waste, increasing the capacity of the cupola and lessening the wear and tear on the lining of the cupola to a very appreciable extent, and with from 50 to 75 per cent less fuel.

"It has been demonstrated by experiment, and it is a well known fact, that air blown continuously through tuyeres into the heated fuel takes up the carbon in the fuel, and combining with it produces an intense heat above and around within a space that is called the melting zone, and produces carbonic acid gas, which has a temperature of 12,000 units of heat. In passing upward it takes up more carbon and is converted into carbonic oxide, which has a temperature of only about one-third the carbonic acid gases. With the ordinary outside tuyeres the gases are wasted. But with the center tuyere, by continuing the center pipe the proper distance and making another continuous tuyere opening, more air is furnished to the heated fuel. Thus the temperature is raised to the intense heat of carbonic acid gas, 12,000 units of heat or more, the gases that would otherwise escape are burned, and a steady melting zone is created, and the capacity of the cupola greatly increased."

We understand The Foundry Outfitting Co., of Detroit, Mich., have the exclusive right to manufacture this cupola in the United States and Canada, and that they will send circulars and descriptive matter upon application.

Notice

Advertisements Entitled Situations Wanted, or Situations Vacant Will be Inserted in this column one insertion FREE. All others 25 cents per line.

SITUATION WANTED, by experienced practical foundryman of good habits, and able to take full charge of foundry plant, doing any grade of light or heavy machinery work. Present location not satisfactory. Address R, care THE FOUNDRY.

FOR SALE, at a low figure.—A thoroughly equipped foundry and machine shop, located at Grand Island, Neb. The only foundry in this hustling city of over 9,000 population. The machine shop is a two-story brick building, 66x33 feet. The foundry is also brick, 33x30 feet. Two cupolas, large crane, core oven, Sturtevant blower, engine, boiler, upright drill, lathe, punch, shears, forge and a large quantity of flasks and patterns form part of the outfit. For further particulars address P. M. Wales, Troy, N. Y., of Geo. B. Bell, Cashier, Grand Island, Neb.

FOR SALE, at a very great loss to close up an estate.—In order to close up the estate of Mr. Huntington Beard, we offer for sale a first-class foundry and machine shop plant, consisting of a machine shop 30x60, three stories high, with a complete set of iron and wood-working tools and mochinery; foundry 60x80 feet, with first-class equipment; fire-proof pattern building, 30x30 feet, three stories high, containing a very large stock of most desirable patterns; also blacksmith shop, storehouse, japaning building and office building; both steam and water power; located on the West Short Railroad and Erie Canal, eight miles from Syracuse, N. Y. This is just the plant for manufacturing hardware specialties, and it can be bought for about one-quarter of its cost. For further information address The Estate of Huntington Beard, Fayetteville, N. Y.

Improved Snap Flasks.

L. W. Boutelle, of the New Home Sewing Machine Works, Orange, Mass., has taken out two patents of improvements on snap flasks that are illustrated herewith.

Figure 1 shows a view of the ordinary snap flask fitted with an improved self-acting catch that is easily operated and so constructed that when closed the flask is perfectly rigid. The chief merit of these flasks, however, lies in the "Coping Device."

Stapled to the cope and resting on extreme top of pins, is an inclined cam and sand shield combined, made in shape to fit the palms of the hands, and by simply pressing down on these cams with the fingers placed under the ear plates, a true and perfect lift will be the result. With this device it is possible to lift the cope three-quarters of an inch as straight as a die, thus avoiding one-half of the rapping through the cope, securing a clean light and making the work more true to the patterns.

Figure 2 is a snap flask for heavy work, and consists simply of an ordinary snap flask cope fitted to a plain cast nowel made with a V piece on opposite sides to fit pins in cope. By making inside of nowel one-eighth inch larger than cope they can readily be slipped off the latter as soon as possible or convenient after pouring, thus leaving a perfect snap mold to be dumped at leisure.

We believe that Mr. Boutelle is desirous of making some arrangement with responsible parties to manufacture his flasks on a large scale.

Figure 3 shows his roll off map flask, adapted for a larger class of work than the ordinary flask.

The cope has a loose cross bar set in sockets made with sharp edges, requiring no tucking, and shallow copes can be used without any damage of sagging, thus making a fine rig for large work.

The roll off hinges are of special design, working free and smooth and no clogging with sand. Between these hinges are two dowel pins and plates, and pins, keeping the flask from any possible shift when closing.

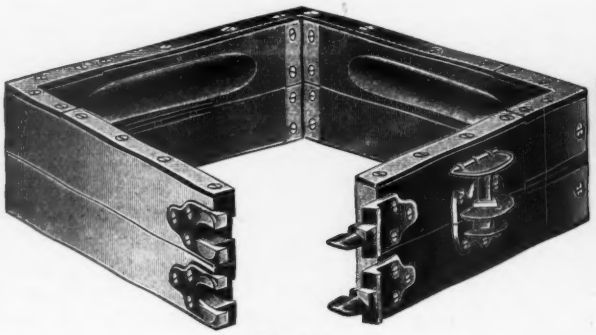


Fig. 1.

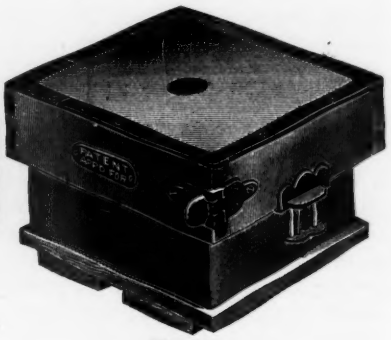


Fig. 2.

Fig. 3.

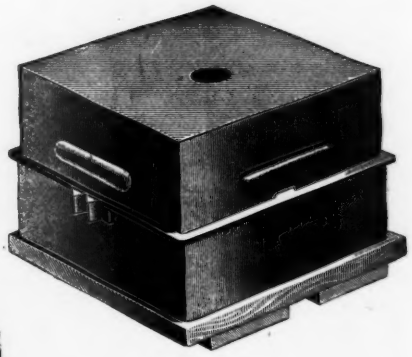


Fig. 2.

CAST IRON NOTES.

Devoted to inquiries from Practical Foundrymen on the subject of Melting and using Cast Iron. Address all Inquiries to W. J. KEEP, care of The Foundry.

We have received another inquiry from a foundryman who is using "Spathite" as a softener. While it is not the purpose of these notes to speak of the virtues of any individual iron, but to deal with the general subject of cast iron, yet this inquiry calls out a few words on the appearance of Silicon iron that will in a measure apply to many other softeners. First appearance of fractures. Pig irons containing over 4 per cent of silicon have such a light colored fracture that those unaccustomed to their use are afraid to use them. Those that contain above 10 per cent have a very dense grain and a light color, and when struck often ring like white iron. To make a silvery iron the furnace must be run very hot, and much silvery iron with silicon as low as 6 per cent has a flaky fracture, and to the user of gray pig would seem to have no grain. Six per cent silicon irons often have as close and as light a grain as white pig iron, but they always have a silvery shine. The appearance of the fracture is no indication of the value of the iron as a softener. The close grain iron will soften as well as the open and it has the advantage of selling for less money. When the writer first met the owner of the ore from which the so-called "Spathite" was smelted, the remark was made that the iron was a remarkable softener but that its good qualities were not indicated either by its analysis or by its appearance, and that the only way to find what it would do was to use it, that it must be taken wholly on our faith in his statement. We took a hundred tons and used it with no injurious results, but this iron that we used appeared in all respects like white pig iron. They say that they never have made anything as bad before or since. As I write I have a sample before me which is said to fairly represent the iron and it is not a bad looking silvery iron. Its analysis does not indicate silicon higher than a No. 2 soft and its phosphorus is not as high as in some of the most popular softeners. Its manganese and sulphur are about the same as the average silvery irons. Its carbon is a little low. This shows that the analysis does not indicate any bad or good quality, bue we have never heard from any one who has used it anything but praise. It is one of the best illustrations of the writer's statements that physical results are not dependent upon the chemical composition, and that strength depends on a compact, closely clinched grain.

It will always be found that with the pig irons and scrap that are cheapest in the market where the foundry is located, the strongest castings can be made.

To do this, however, an accurate method of testing must be used. The shrinkage must be measured in thousandths of an inch and not in sixty-fourths, or even in one hundredths measured with a rule. An actual test of strength is the only way to find whether the iron is strong or weak. If weak, by changing the proportion of the different irons it will soon be found that the casting grows stronger.

Often by adding a softener that would break if dropped on another pig of iron, the strength of the casting will be greatly increased.

The founder when he sells castings sells strength, softness, hardness, chill, toughness or some other physical quality. The purchaser does not care what the composition is, or what the casting has been made of, if he gets the right physical qualities. These physical qualities do not depend upon the chemical composition, or upon the appearance of the irons that entered into the casting. The only way to reach the best result is by a physical test.

Visit to Foundry of Wm. Sellers & Co.

In our issue of July 10th we gave our readers a general description of the iron foundries of Wm. Sellers & Co., incorporated, including reference to their peculiar system of interchangeable cast iron flask bars, the extensive application of traveling cranes, and the introduction of an economical and effective centrifugal sand mixer.

As it was impracticable to describe in the space allotted to that article various other interesting improvements, we intimated that in a future issue our readers might look for a description of the "Vicars Mechanical Stoker" for feeding boilers, by the aid of which bituminous slack or any other combustible material is consumed without smoke emerging from the chimney, and also for a descrip-

tion of the brass foundry in which the coring of castings composing the body of automatic injectors has been reduced to a science.

THE VICARS MECHANICAL STOKER.

It has long been known to engineers that the question of economical firing of boilers is one of the greatest importance wherever a large plant is installed.

The frequent opening of furnace doors, and dumping of large quantities of coal at irregular intervals upon the fire necessarily results in cooling off the boiler temporarily, and in the distillation and consequent imperfect combustion of the fuel.

The "ideal" method of feeding coal to boilers would be one in which the fuel would be continuously and automatically spread over

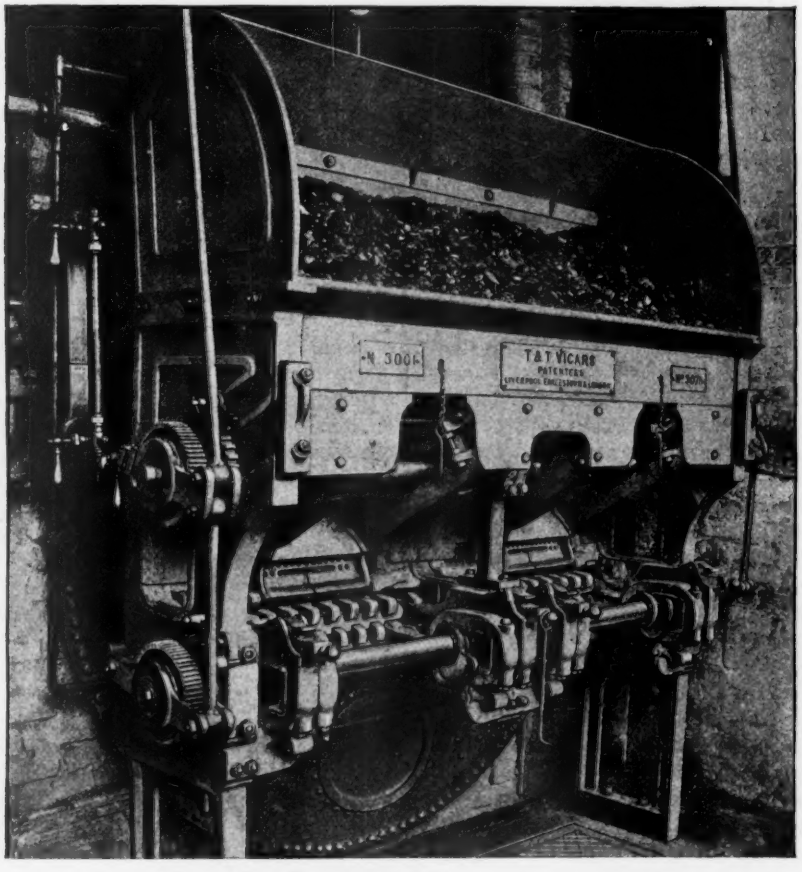


Fig. 1.

The Pennsylvania Railroad authorities investigated the consumption of coal under locomotives some years ago and found that a skilful fireman could save the amount of his wages in fuel, as compared with a poor fireman, while at the same time increased efficiency of the locomotive was obtained; this led to the establishment of awards for economy in firing locomotives, which have largely reduced the waste of fuel.

the grate bars in a thin layer without the necessity of opening the fire doors at all, and of course appliances would then be required for frequent automatic raking to prevent the formation of clinker.

Various forms of mechanical stokers have been devised to accomplish these objects, and satisfactory results have attended some of them, but the fact that such appliances are not more frequently used indicates that

perfection of mechanism has not heretofore been attained. One of the difficulties encountered has been in the rapid destruction of grate bars, another has been due to the expense of operation, thereby limiting the application of such appliances to large plants.

A few years ago the firm of Wm. Sellers & Co., Incorporated, was induced to experiment with one of the mechanical stokers invented and patented by Messrs. T. & T. Vicars, of Lancashire, England, attached to a hundred horse-power boiler of the Galloway type in their foundry.

These experiments led not only to the adoption of the Vicars stoker at their works, but to the invention of certain improvements adapting it to American practice, and eventually caused them to secure from the patentees the exclusive right for the manufacture and sale of these stokers in the United States. They are now made of various sizes and types suitable both for internally and externally fired boilers and furnaces.

The illustration No. 1 shows the latest form of stoker and No. 2 exhibits a large battery of boilers with these appliances.

The principle upon which the operation depends is exceedingly simple, the fuel, whether hard or soft coal, is fed into hoppers, from which it is conveyed to grate bars provided with a reciprocative motion whereby the coal is kept constantly moving forward and any unconsumed particles pass into a combustion chamber where all the carbon is consumed. So complete is this

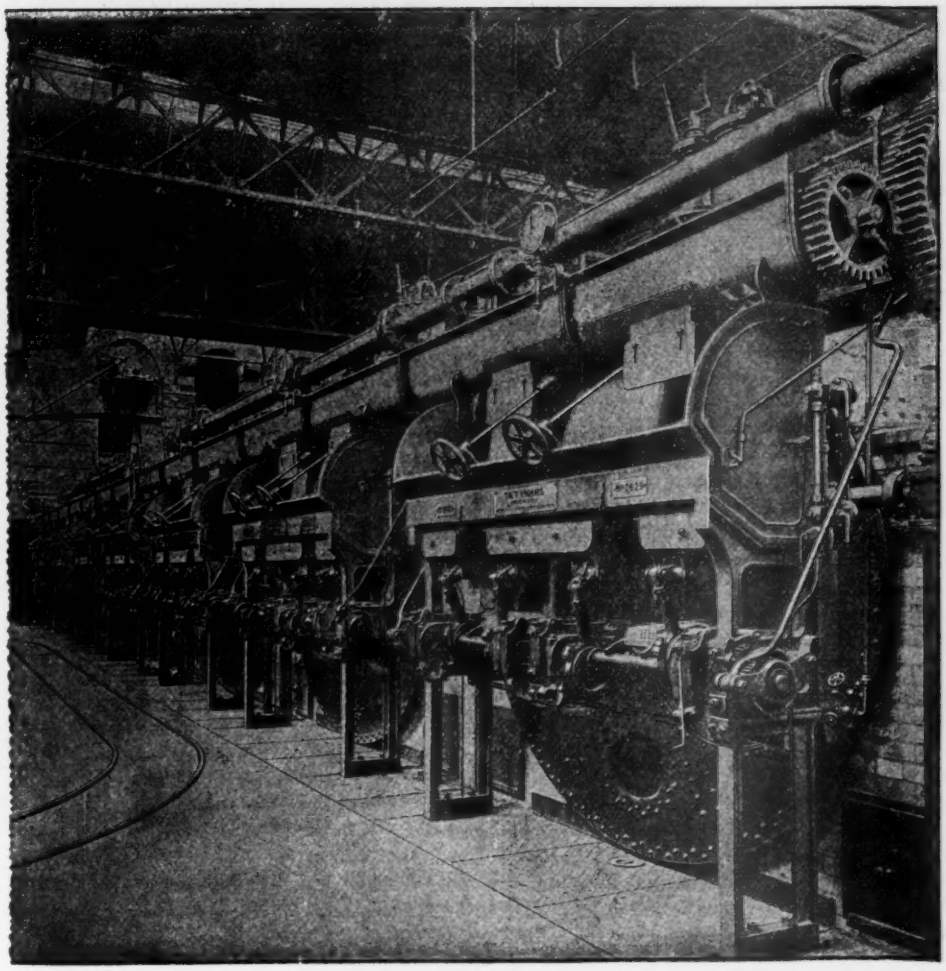


Fig. 2.

combustion that no smoke emerges from the chimney with any kind of fuel that has been presented for test.

The following description of the construction and operation of this appliance is quoted from the Standard Treatise on Steam Engines and Boilers, by Mr. Daniel Kinnear Clark, M. Inst. C. E., M. I. M. E.:

"In the system of Messrs. T. & T. Vicars, in which, as was stated, small coal and slack are fed automatically into the furnace, the fuel is fed from a hopper into two cases or boxes, from which it is gradually pushed by reciprocating plungers alternately into the fireplace, when it falls on the fire-bars, which, by a slow reciprocating movement, carry the burning mass gradually backward. Such unconsumed coal as reaches the end of the grate-bars, together with the clinker and ash-refuse carried back, are discharged over the ends of the fire-bars into the flues, wherein they form up and maintain a bank, which acts as a bridge, closing the far end of the ash-pit, and on which the combustion of the precipitated fuel is, in due course, completed. An ordinary bridge of brickwork is built in the furnace-tube or flue, at a distance of 4 feet from the ends of the fire-bars.

"The supply of fuel and the travel of the fire-bars are regulated with facility, independently of each other, by means of a simple mechanical combination, for which motive power is required. The travel of the bars may be adjusted of any length, from a state of rest to a maximum of 4 inches. The alternate fire-bars are lowered and drawn towards the front of the furnace, and then all the fire-bars travel inward together. The motion is derived from a driving shaft, on each end of which an eccentric is fixed, working a ratchet-wheel and pawl, by which a transverse shaft at the front is caused to revolve. By means of cams on this shaft the horizontal movements of the fire-bars are effected. The speed of this motion can be regulated to from 30 to 120 turns of the shaft per hour. The furnace can, when required, be fed by hand through a doorway between the two pushing rams.

"A Lancashire boiler, 20 feet long, 8 feet in diameter, having two flues 2 feet 10 inches in diameter, fitted with Vicars' Stoker, and worked at a pressure of 50 lbs. per square inch, has frequently come under the inspection of the writer. Previous to the application of the stoker the boiler was worked with smokeless Welsh coal, at 18s per ton, hand-fired, of which 2.08 cwt. was consumed per hour, costing 1s 10 1-2d. Since the Vicars' Stoker was applied, ordinary household slack, at 8s per ton, is used on the same duty, and consumed at the rate of 2.18 cwt. per hour, costing 10 1-2d per hour, and saving 1s per hour, or 53 per cent, when compared with the previous practice. The Mechanical Stoker works without producing any visible smoke at the chimney top."

As additional testimony in this same direction, in "A Text Book on Steam and Steam Engines," just published (September, 1892), Professor Andrew Jamieson, M. Inst. C. E., Professon of Engineering at the Glasgow and West Coast of Scotland Technical College, M. Inst. Electrical Engineers, Fellow of the Royal Society, Edinburgh, writes:

"The economy of the Vicars' Stoker over hand-firing has been abundantly demonstrated by time tests in Europe and in this country, while the freedom from pollution of the atmosphere by particles of unconsumed carbon is a desideratum of enormous value wherever soft coal is used."

Nearly 4,000 have been made and sold in Great Britain.

The city of Pittsburg, for example, enjoyed a few years of clear sky and sunshine during the reign of natural gas, but it has again reverted to its former grimy condition and is destined to remain partially eclipsed until improved mechanical stokers are generally introduced; that this will be done in a few years there is little doubt.

Wells & French Co. are building a gray iron foundry 157x130 feet. They are very busy, and are working on an order for 2,000 (two thousand) box cars for the C., B. & Q. R. R.

Pokey's Pointers

When Pokey entered the shop with his features wrapped up in a cucumber smile Tom Bowers knew that another scheme was about to be floated. Pokey had, since he began taking an interest in the foundry (at least his proposed reforms dated from that time), floated several issues of improvement stock, which it was difficult to dispose of on account of the great amount of water it contained.

"Tom," said Pokey, "I have something to tell you. I have made up my mind that

we need a superintendent for this business here. You know I am away a good bit, got so much to tend to. Of course you and old Pat Egan in the machine shop have got a'long first rate. We have always made money, thanks to our reputation, but that ain't it; other people have somebody away up; then they have speaking tubes to connect them, and it gives a kind of dignity to the whole place. They are dirt cheap, too, Tom. I have letters from a lot of fellows, saying they are competent to run this concern; have diplomas and certificates to prove it, too, and what do you think I can get one for? Half of what I pay either you or Egan."

"Well, if you want a man cheaper than me, Mr. Pokey, take him. I don't work for love not for any man, you can just——"

"No, no, Tom, there is no intention to change you, your pay or anything else. I just mentioned this to show that the price of superintendents is away down; they come cheaper than the average workman, and it must pay to have them. You know what we want is some kind of a man who can juggle with figures, keep six balls in the air all the time, so to speak, when anything is to be done. Now Egan says what he has got to have and you say what it will cost in here. In that way people get an insight into our business and sometimes jew us down because your talk is too plain."

"I can't hypnotize customers into paying for things they don't get," said Tom.

"Of course not, but look here, when I get a superintendent and refer callers to him, they will at once know that they are looking on somebody. If he is smart he can account for things in a way that they can't talk back to him. That is where the beauty of it is. I have run against some of them myself. A man has got to be away up to get around them. Let me just get one and it will soon be noised around that we are the people and must be respected."

"And what did you say you could get such a man for?"

"Seven hundred dollars up; right out of college, too; the market seems to be glutted with them."

"Mr. Pokey," said Tom, "did you ever hear of the manager down east who was looking for a foreman. Upon hearing of his wants one of his friends recommended half a dozen men who were looking for such a place, and wound up by saying that any of them could be secured for at least a thousand dollars a year. "My friend," said the manager, "I am not in want of a thousand dollar a year foreman; what I am looking for is a twenty-five hundred dollar man, a man that is worth it, knows it and won't take a cent less. I want a foreman, and know I have got to pay for such."

"But it is different with us. We can get along with most anybody, just to give us a little dignity, you know, a higher standing, a better rating, whatever you are a mind to call it."

At this juncture a customer appeared with a broken casting and requested Tom to come out to the wagon to view the corpse. "We would like to have it to-night, if possible," said the owner. We are in a hurry to get some work out."

"I will try to get it done on time for you," said Tom. That was as far as he ever went with promises. "You can leave the pieces here and I will have it tended to."

"Here, Coffindodger," said Tom to one of the molders, "is a job for you. Take Rattletrap Pete with you to get a flask and let him cut up some sand for you and help to get things ready."

Mr. Pokey had so far contented himself with looking on, but something on his mind caused him to remark: "Didn't you tell me once, Tom, that Coffindodger was the slowest man you had in the shop?"

"Yes, sir."

"And this is a hurried job.

"Yes, sir."

"Didn't you have somebody else you could put on that job?"

"Yes, sir."

"Tom, I don't understand you. Here you are, with a badly wanted job, and yet you seem purposely to shove the slowest molder in the shop onto it. What does it all mean, anyhow? Is there another of your pointers concealed underneath this way of working?"

"A sort of a small one, not very well defined," said Tom. "You see, here is Nick, the Ripper, he is the fastest molder I have got, but Nick ain't got any think tank on him; when he gets a job he slaps it down and goes to ramming, leaves a pin, maybe, or forgets part of the pattern and has to shake the whole thing out, has a sort to learn by experience, you see, loses maybe the first of everything I give him, but after he is onto the job, he makes up for it; he rips them out

sure enough. On the other hand, here is Coffindodger, a slow cuss, to be sure. Look at him, there, eyeing that job; ain't got started yet, but it is no use to hurry him; you can't. He won't get through sizing that job up for an hour yet; maybe he will even keep the blast back, but when his mold is ready to cast it is ninety-nine chances out of a hundred that it is good. That is why he got that job. The insurance comes high, but we got to have it, and it is the cheapest. If I had a hundred to make someone else could beat his time all hollow. He is the slowest man in the shop, but he has the smallest percentage of bad castings. I can't afford to experiment with such a job as this; got to have it the first lick. I pay him as much wages as any other two. A whole shop full of his kind wouldn't pay, but I would rather lose three of the fastest molders than this one slow going cuss. When I don't have a job like this for him, he seems to be a loss to the shop, but with the kind of work we have he comes in handy,"

"A molder can work too fast, then?" said Pokey.

"No, not exactly; a man can't work too fast if he does his work right, but the tendency among rushers is to slip some little spot to make time; that will make trouble later on."

"Well, Tom, this is something new to me. When you have plenty of time to turn out castings, you give the job to men who jump right into it, and when you have a job that must be made in a hurry the slow molder comes in. Look at that fellow, ain't showing any intention of starting yet."

"He won't begin till he has got everything he wants ready, and made up his mind how it is going to be done, but he hardly ever disappoints me. I know I can expect a good casting from him the first time. He earns his pay as well as others if he don't do half as much, for a job entrusted to him I never have to offer excuses the next morning because it ain't ready. If there is anything I hate it is to have to explain to an outsider how we came to lose a casting. Every kind of a molder has his place in the foundry, Mr. Pokey; they are all good, if you know where to put them."

"Then if a set of men don't do right it is because they ain't handled right; is that it?"

"That is the general rule; if you have a slow molder put him on a job that requires patience. If you have a poor mechanic, give him something within his ability."

"And what if there is nothing to do that will fit their case."

"Discharge them; that saves cussing. Profanity never made a good workman out of a poor one, or saved a bad casting. If I have nothing that a man can do as it ought to be done I lay him off and explain to him the reason. I tell him that he has climbed up too fast and had better go down a couple of steps that he forgot to stop at in coming up. I show him how to work so that he can fit himself for a better job. The trouble with most foremen is, the minute they give a man a job they expect him to go right along with it. Instead of picking the job out for the man or the man out for the job it is, here, you take that and you take this, and the next morning it is hell and a general benediction."

"I guess you are right, Tom, but I can't forget about that hurried job and that snail-pacing mug you gave it to; it is a queer combination. Are you out of anything, Tom?"

"No, not exactly out, because we never had them, but there are some things we ought to have. They don't amount to much, but it seems hard to get them."

"What are you after now?"

"I want a monkey wrench."

"Ain't you got one. Egan will let you have one from the machine shop."

"I don't ask for a wrench from the machine shop, have had too many from that place now. You can either furnish a brand new up-to-date monkey wrench for the foundry, or I will send for a machinist to tighten every bolt that becomes loose. Whenever this side of the house needs a wrench it has to go and pick it out of the machine shop scrap pile; the handle is gone, it can't be adjusted; in fact, it is worthless, or else it would not be discarded over there. I can't do anything with dead tools; have skinned my hands too often now trying to revive them. Know how they work and have some sympathy for others compelled to disfigure themselves in using them."

"Anything else?" said Pokey, as he made a note in his handbook for an A1 wrench.

"You notice that corner there, supposed to be my office?"

"What is the matter with it?"

"What is the matter with it? In the first place there is no door at all to it; everybody

got a chance to fire things into or ramble through it. Is that a fit place to call an office? I will be hanged if I can put a clean towel in there, but that somebody marches right in and wipes on it."

"I will try to get it straightened up," said Pokey, as he walked away.

"Well, you know," Tom hollered after him, "I wouldn't mind it so much, only some of those mud chunks don't wash themselves half clean."

Texas Foundrymen's Association

The Texas Foundrymen's Association held their last meeting in Austin, Texas, Sept. 23rd, the meeting being called to order by President Moore, in the parlors of the Driskill Hotel. The secretary reported the result of his correspondence with railroad commissioners and the traffic managers of the different southern roads, and all seemed willing to aid in any way possible, but comparing rates Texas foundrymen had to compete with against St. Louis, it was found that if they went 40 miles from the city, they met St. Louis competition on an equal footing as far as freight rates were concerned.

A committee consisting of Messrs. J. E. Austin, C. P. Wiggins and W. S. Mosher was appointed to call upon the railroad commissioners and urge the necessity of lower car-load and L. C. L. rates, as well as lower rates on raw material. At this meeting the railway men insisted on a definite statement as to what was needed, and exact figures as to difference of cost of production between Texas and St. Louis foundrymen.

Later the foundrymen reconvened and prepared such a statement, showing the Texas foundrymen to be handicapped to the extent of $5.25 a ton. This conclusion was arrived at on a basis of both paying the same wages and having equal facilities for doing work.

In the evening the joint committee from the railroads and foundrymen had another session, at which a report embodying the foregoing was presented and reasons cited why it might benefit the railroads in the end. The representatives of the railroad companies expressed surprise at the showing made, and promised to do all in their power to have the necessary concessions made, and that the subject would be brought up before the South Western Traffic Association at their next meeting. The Texas railroads have already made some concessions, and promise further assistance whenever possible.

Before adjourning a constitution and by-laws were presented and adopted, and the association decided to meet in Fort Worth in the month of January.

Those who attended this meeting seemed to enjoy themselves and appeared well satisfied that much good was sure to result from it. One thing appeared certain, that much of the close competition so apparent before the forming of this association was now wearing away, as the members became better acquainted, and the penetentiaries had likewise been less agressive than formerly.

Mr. A. Sorge, jr., 1533 Marquette Bldg., Chicago, is acting in the capacity of consulting engineer for Louis V. Shaw & Co., who are erecting an open hearth steel casting plant at Milwaukee, Wis.

The Galena Foundry & Machine Co., at Galena, Kansas, have purchased a new site and will remove to it, enlarging their works considerably.

The Huyett & Smith Mfg. Co., Detroit, Mich., has changed its name to the American Blower Co. Mr. Huyett withdrew from the company ten years ago and Mr. Smith quite recently, hence the name from a personal standpoint had no significance.

The new machine shop for The Granger Foundry & Machine Co., at Providence, R. I., will be one of the largest and most complete in the New England States. The building is designed and built by The Berlin Iron Bridge Co., of East Berlin, Conn., and is 110 feet wide and 306 feet long.

Fast Workmen and Good Work.

H. HANSEN.

I have added the last two words to the above heading for without them the inference as to the contents of the following would in most cases not be altogether right. Most of us are acquainted with fast workmen, the kind that goes flippety-flop and whose exhaust can be heard for a mile. You can't help but notice them. We see them make a spurt about once a week that threatens to kill the job and the next day we find thirty-three per cent of their castings on the

wrong side of the chipping room. About a week afterwards we see half of the balance of that big day's work being wheeled from the machine shop to the boneyard. What is left now does not make such a dazzling light as to blind you. The pile is very small after being refined and weeded out, and some of you fellows who only made two-thirds as much work as the rusher, but saved it, I know how you feel, how you wish that the facts and figures were more generally known.

Having been there myself, I remember the night before when the old man came around to figure up the heat, how almighty small I felt at the rear end of my short row of flasks. His very looks seemed to say, 'Henry, you are no good on earth; better get off.' I also retain an impression of that contemptible look the fellow with the big floor gave my little pile. Now in acknowledging that when the funeral train of this fellow's big day's work was passing by I returned every bitter reproach and look that he had showered upon me with interest, in owning up to the fact that I swelled up to the size of a dutch brewer and gave the other fellow a chance to take a turn at swelling down I feel that I acted not according to the golden rule, but as a human being, that I was yielding to a phase of human nature which there is no reason to conceal. A premature display of conceit by anyone doing a big day's work is to be deplored and when the venture ends disastrous, should some sort of rasping not be done on that fellow's feelings to prevent a recurrence? The one who laughs last, laughs the best.

I never believe in counting the number of flasks a molder has on the floor except to know how much iron is wanted. It is a poor way to count castings; like counting the chickens before they are hatched, and about as reliable. It indicates nothing, it is easy enough to fill a box full of sand and call it a mold, but the casting is what counts. The chipping-room is the lowest place that the day's work of a molder should ever be considered, but the true test, a test that would reverse many a record breaker into a dishonorable discharge if facts were known is to count the castings when they are finished up and ready to be assembled. The flaws that may be found later can seldom be traced to the molder. Not only is this the proper place to reach a nearly correct decision, but if the time taken to put the castings of different molders into shape for shipment was taken cognizance of, some molders who are looked upon as no good would be pretty near to the top row by taking every redeeming quality into consideration. Before I would undertake to put a rating upon a molder's ability, that is where I would look for a nearly complete record of his work.

This class of molders, the fast workmen and poor work would never kill a job if a close examination was made of their productions and the cost of trimming up their work was looked after. I am only sorry to say that they do sometimes cause the day's work to be raised beyond the legitimate limit to the great injury of those who try to do their work right, but this can on'y be accomplished where the near-sighted head of the establishment counts only the molds and bases his calculations accordingly. It is a very treacherous chart to be guided by and liable to land the whole concern on the rocky shores of an unknown coast.

But I meant to speak only of fast workmen and good work, and here I have gone and got started on the opposite side. Let us cross over and take a look at those people and their product, the fast workmen and good work. "Never heard of such," you say. Oh, yes, but there are quite a few molders who can work fast and do good work at the same time. They are very interesting, too, and you will admire these dexterous molders when you know them better.

When you look at two molders working side by side on the same job and see that one has got up nearly twice as many molds as the other, you naturally want to know the cause. Look at one of these on the small floor. Joint properly made, mold neat and clean. Look at one in the long row of flasks standing zig-zag and inclining at different angles as if they were riding out a gale in midocean, molds full of flour, loose blacking and dirt, a big fin where the cores have been filed too much and you have some of the reasons why this floor is so long. But hold on. I am getting over to the fast workman and poor work again, the very fellow I don't want to consider. Come back and we will make a fresh start.

Come right over to the one we want to know something about, the fast workman with his good work. You will notice that he, too, has done a big day's work, but you find

everything in ship-shape, sand pile neatly trimmed, dust wet down, his shovel is clean, all the tools he uses are handy to him. You will notice he has got everything he uses right on his floor. You don't find him attempting to steal his neighbor's parting sand, got some of his own, got everything he wants. These are two reasons why he is a fast workman and can do good work at the same time; the first because he keeps everything straight, the second because he has on hand all that he uses, even tobacco, without annoying those next to him with raids upon their supplies.

There are but few molders who realize the impetus they can give to their work by keeping their floors in order. There are stil less who attempt to furnish themselves with a lot of small things they need. We can hear them plain enough cursing the management because the bellows show a leak, but we don't find them condemning themselves when such a thing as a small drawspike is wanted. No, then it is, I will go and borrow McGinty's, instead of making one for themselves. Now our first molder does not impose upon those of his shopmates who have taken the pains to get a few things for themselves. He takes likewise another step towards fast work.

When shaking out, his flasks will be found piled in a creditable manner without having guides, bars or pins broken. This is essential to fast work, because time is consumed in repairing or finding someone to do it. But probably his greatest help towards doing fast work is the ease with which he takes advantage of circumstances. A great number of molders follow a certain programme and if you attempt to change the numbers of this they get rattled. They get into a certain way of doing their work, this first, that second. Now, if you should tell them to do that first and this second they would act as if they were in a labyrinth. The fast workman is ever ready to change his mode of working to suit conditions, another necessity to fast work.

A fast workman is probably the recipient of more uncalled for slights than one of less ability. Among all classes of people we find a tendency to ignore those from their midst who rise above them. We are willing enough to let our admiration go on to an extent that amounts to almost idolatry for anyone who has risen from some field outside of our own, but let one of our own bedfellows, whom we used to roll around with in the sandheap, begin to grow a pair of wings and ascend, how soon we show our jealous disposition. In common with many others I was therefore at first inclined to follow the example of New York's Four Hundred in dealing with men who could do more work than myself. I attempted to cut them, ostracize them from social intercourse so to speak, and what good did that do? They put up just as much work anyhow; they made friends just the same. It did not help me to increase my day's work, but it did cause my actions to indicate that I had partaken of a vegetable known as sour grapes. When a molder walked around me in his day's work my feelings took a turn like the streets in Boston—and who cared a rap? I have found it far more agreeable to find out how they manage to turn out more than I do instead of making a donkey of myself; it is pleasanter to drift along with the current than to hump up one's back and try to stop its progress.

We often find molders waiting for the crane; sometimes this is unavoidable, but more often with a little display of foresight on the part of the waiting ones this could be done away with. Your fast workman hardly ever waits for the crane, but uses it whenever a chance is offered, and consequently has something to do, while others never think of the crane or anything else for that matter, till they are compelled to use it. Your fast workman looks ahead all the time. If he sees Bill Snoozer is going to use the crane shortly he puts on his cope and then gets his gaggers, gates and small things ready. Bill Snoozer does different. He begins to look after a thing only when he must have it, and the chances are that sometimes others are using them. Bill Snoozer is always hollering for something and swears there is a conspiracy to keep him back. Your fast workman is seldom found complaining. Is he to blame for using all the resources within him? Shall he be condemned because he does his best?

If your fast workman observes one of the laborers attempting to get the crane post between himself and the foreman he will likely recollect that there is something out in the yard that he will need a hand to bring in shortly. Is it not perfectly right that he should send this fellow after it, for when

the time comes for him to use it in all probability others have gathered up the extra help around the shop.

It is an erroneous idea to suppose that a fast workman must be the possessor of an extra amount of physical strength. It is disproved by the great number of small men that make it interesting for and scoot ahead of their heavier proportioned brethren. Neither is it necessary that a fast workman shall "fly;" most of them don't. It is seldom that anything will be found about their motion to show they are in a hurry; they seem to make about the same number of revolutions as their slower neighbors, but every move is made to count, and there is no going over the ground a second time.

To become a fast workman it is entirely unnecessary that one should have more than the ordinary strength allotted to man, nor that a faster gait should be followed than is consistent with ordinary endurance. Those who will keep their surroundings and tools in order will have made a great stride toward a goal most of us are trying to reach. We may all dislike the workman who is capable of producing more than us, yet behind all this we often wonder what is hindering us from doing as well and secretly wish that we could trade places. As an attempt to accomplish this try in working hours to keep things straight, have your own tools, take advantage of conditions, avoid political and pugilistic discussions and look ahead.

More Foundry Literature.

At the last convention of the Iron Molders' Union it was decided to enlarge and improve their Journal by increasing the number of pages of reading matter to 24 and adding a limited number of advertisements. To do this it was arranged that an editor should be selected who would give his whole time and attention to the Journal exclusively and we believe that the officers of the organization have selected Mr. David Black, of Toronto, Ont., for the position, and that the first issue of the improved Journal will appear in January, 1896.

Personal.

C. Nellis, of E. Chicago, has accepted the foremanship of the Lake Shore Foundry, Chicago, Ill.

John Meehan, formerly foreman of the Lake Shore Foundry at Chicago, Ill., has taken a position as foreman of the Whitley Mfg. Co., Muncie, Ind.

Irving Barker has disposed of his interest in the Barker Mine Car and Foundry Co., at Springfield, Ill., to a new company. He will probably travel for them, however.

W. H. H. Mackellar, formerly of the firm of Robt. Mackellar's Sons, manufacturers of Foundry Facings at Peekskill, N. Y., has taken a position as Supertendent at the Albany Facing Mill Co.'s Works, Albany, N. Y.

F. P. Olds, Manager of The Medina Foundry Co., Medina, Ohio, has rented that plant to Mr. C. C. Engel, a practical foundryman of that place, and will build and manage the plant about to be erected by the Root Bros. Co., of Plymouth, Ohio.

Among the Foundries.

The Penn Foundry at Kansas City, Mo., is being operated on the Profit Sharing plan.

J. F. Allen has purchased the Livermore Falls foundry business of E. A. Keene at Livermore Falls, Me.

The Belle City Malleable Iron Co., of Racine, Wis., are making $75,000 worth of improvements at their plant.

J. W. Lewis has purchased Alexander Bros.' foundry and machine shop at Murphysboro, Ill., and will operate it.

The Harvest Stove Works at South Pittsburg, Tenn., that has been idle for some time, will be sold at auction October 30. It is hoped to have it started again very shortly.

It is said that the Iron Molders' Union are going to accumulate a fund of $25,000 with which to start a co-operative foundry to give employment to members of the union only.

Byram & Co., of Detroit, Mich., manufacturers of cupolas, cranes, ladles, etc., have made an assignment. It is understood, however, that the works will run along as usual, that step having been taken to protect their creditors against what was thought to be unreasonableness on the part of one of their number in trying to force collections.

New Foundry Enterprises.

The Superior Foundry Co. at Albany, N. Y., is a new corporation.

Godfrey Rebman & Co. are building a foundry 32x100 in Philadelphia.

Godfrey J. Bremer has commenced to build a foundry at Kalamazoo, Mich.

The Reading Hardware Works are erecting a new foundry at Reading, Pa.

The National Mfg. Co. at Huntsville, Ala., have their foundry running.

The Dickson Car Wheel Co. are erecting a large new foundry at Houston, Tex.

E. Hermann is talking of starting a stove foundry at Shreveport, La.

H. W. Gehr has started a foundry at Wadena, Minn.

The Bright Foundry Co., a new concern at Saginaw, Mich., expect to have their new foundry running in 30 days.

Martin Windell is erecting an extensive foundry and machine shop at Hundred, West Va.

The Damascus Steel Co. is the name of a new company who will make steel castings in Des Moines, Ia.

Hollis & Potter have leased the old C. A. Treat Car Wheel foundry at East Chicago, Ind.

Webber & Philbreck have commenced to rebuild their foundry recently destroyed by fire at Fairfield, Me.

The Le Baron Foundry Co. at Middleboro, Mass., have commenced the erection of a large modern foundry to be 165x75 feet.

The Worcester Foundry Co. have leased the old Rice Barton & Fales foundry in Worcester, Mass., and will operate it.

C. M. Reed, John R. McDonald and Fred Clark are among those arranging for the erection and conducting of a large new foundry at Erie, Pa.

The Walworth Run Foundry Co., of Cleveland, Ohio, intend to erect buildings for a branch establishment at New Brunswick, N. J. They have a large eastern trade that they hope to care for in this way.

Jacob Shaaber and John Herb have purchased the interest of the late Henry Johnson in he Frnklin Iron Works at Reading, Pa. Mr. Shaaber has been foreman of the foundry for 35 years.

Fire Fiend.

Kamm & Wertz's foundry at Lancaster, Pa., was destroyed by fire October 3.

Horn, Orr & Co.'s foundry at Beaver Falls, Pa., was destroyed by fire September 23.

The Morgan foundry at Brockport, N. Y., was completely destroyed by fire September 15.

T. J. Dunleas foundry at Binghamton, N. Y., was totally destroyed by fire September 7.

The Keith Furnace Co. at Des Moine, Ia., was destroyed by fire September 13. Loss $10,000, insurance only $2,300. They will rebuild at once.

S. J. Benedict's foundry at East Randolph, N. Y., was destroyed by fire September 24. Loss $15,000. It will be rebuilt immediately.

The Enterprise Foundry at Canton, Ill., burned September 24. Loss $1,500.

Deaths.

George P. Sisson, formerly foreman of the New Home Sewing Machine Works at Orange, Mass., died at Stafford Springs, Mass., September 21.

James Shronds, who was over 30 years ago engaged in the foundry business at Rochester, N. Y., died at his home in Chicago, September 27. Aged 88.

Dr. John S. Linton, the oldest resident of Athens, Ga., died there September 10, aged 83 years. He was the founder of the Athens foundry and prominently identified with various other enterprises.

Ira P. Rankin, one of the proprietors of the Pacific Foundry, San Francisco, Cal., and President of the Engineers & Foundry Association, of San Francisco, died there October 1. He was a very prominent and popular citizen.

James Chalmers.

The History of a Tramp Molder

W. EDWARD.

CHAPTER XXI.

On arriving in Springfield I went first into a small agricultural shop near the depot, I forget the name of it now, and made the acquaintance of the foreman, who seemed to take considerable interest in me

and told me the name and location of the shops where I would be most likely to strike a job to my liking, warning me against striking the agricultural shops, as I would stand no show with the "weavers" and could not make my salt. Before I left he told me if I did not succeed in striking anything to come back and, in the meantime, if he heard of anything he would let me know. I took in all of the shops of which he had given me the names, which took me all of that day and a part of the next, but without striking a job, or seeing any show for one. In one of the shops which I struck I saw a molder and two helpers make twenty cable yokes for a day's work and this made me anxious to get away from Springfield, besides, in another shop I saw several men ramming away at ten minutes of six, with part of their floors poured off and learned that they were working like this for $2.25 a day. I returned to my friend, the foreman, to bid him good bye, and tell him I had seen enough of Springfield, when he told me of a shop which he had not thought of before and said he had heard the night before that they wanted a molder, so instead of taking the train for Columbus I walked out to see if I could strike the job. After a long walk I found the place away out on the Ohio Southern railroad, on the outskirts of the city. It was a boiler shop with a small foundry at one end and I was not at all prepossessed with the looks of the place. I inquired of a man who was just making the sand fly, who the foreman was, and he informed me he had that honor and asked what I wanted. I told him and he said they wanted a molder but he must be a first-class man, and asked if I was a good molder. I looked around the shop and told him, that while I did not profess to be an expert, I thought I was capable of doing any work they had in the shop, and asked what wages they proposed to pay for a first-class molder. He said they would pay $2.25 to a good man and the way he said it he seemed to think $2.25 munificent wages. I laughed and said that I would come out in the morning and give it a trial and see whether I could make the work. I found a boarding house about half a mile from the shop and the next morning I showed up for work.

By the way, the foreman talked about "particular work." I had expected nothing less than a locomotive cylinder, or some equally intricate job, and I was not a little taken back when he came in with the two halves of a boiler front and laid them down on my floor. I asked if that was a sample of his good work. He said it was, and cautioned me to be very particular with it, as it was going to Minneapolis to be placed in a big flour mill and the superintendent wanted a "shiner." Then he took me out in the yard to show me the flask, which lay flat on the ground, cope side down, and had lain there so long that the weeds had grown up, almost hiding it. When I got the flask in the shop and commenced to examine it I was tempted to put on my coat and go home. The flask was about six feet by ten, the drag was made of inch lumber, with a fence board nailed across the middle to hold it square; this board came flush with the joint of the drag so that I had to raise my parting about three inches to clear it. I had to bed the pattern in, too, as there were no boards in the shop large enough to roll it, and it was doubtful if we could have fastened it securely enough to roll with such a weight of sand. The cope was even worse than the drag. It had lain out in the weather so long that the sides were warped and twisted, and sprung away from the bars on both sides. If there had been a crane in the shop I could have secured the cope so that it would carry the weight of the sand, but the only thing in the shop resembling a crane was a block and tackle which hung from a beam over one of the floors. It was out of the question to try to use this on my flask and the only thing I could do was to roll it. Before ramming it up I had put a couple of spikes in each bar to try and spring the sides back to place and I put so many gaggers in it that I was not afraid of a drop out unless when the weight of the flask came on the side it would force it to place and crush out the sand. Well, I rammed it up, rolled the cope off and finished the mold without any mishap, but when we came to close it the fun commenced. I had told the foreman that I was afraid of the side crushing off and as soon as we got it over I called his attention to a ridge of loose sand all along the edge of the flask; he said he would fix that and while I finished the mold he got a lot of nails and placed a double row along the side of the cope. The first attempt we made to

close it the sand slid out onto the joint, nails and all. It didn't hurt the mold any, but we had to lay the cope back to clean off the joint and it gave me a pointer on how to close the thing. The foreman suggested nailing again, but I would have none of it. Instead I took my trowel and cut away the sand for about an inch from the edge of the flask as far up as I could reach and then we tried to close it again. My plan worked all right that time, but the straining of the flask had loosened the sand and a big piece dropped off the face of the mold, and back it went again to repair that damage. We tried to close that flask a dozen times before we finally succeeded, and the only wonder was, with all the lifting and straining, that the whole thing, gaggers and all, didn't come tumbling out.

After all my work and worry over the thing, after I had got it closed, the foreman said, "Now, you'll have to get a move on you, because the superintendent knows what a day's work is." I told him that I didn't give a ——for him or the superintendent, that my day's work was what I could do in a day and if he didn't like it he knew what he could do. At this he clapped me on the shoulder and told me not to get mad, but to do the best I could. Then he gave me a crescent shaped piece to make in open sand, the pattern was about half an inch thick and he wanted a plate an inch thick, so I struck off a bed and commenced to level the pattern with my eye before applying the spirit level. While I was working away a man, with clay wash all over him, and whom I took for the cupola tender, stepped over to me and said, "Look here, young fellow, we's got a spirit level in the shop for making work of that kind, and we don't want that plate a half inch thick at one end and an inch and a half at the other." I sat back in the sand for a moment and looked at him; then I grabbed the level, which was lying beside me, and made a pass at his head, which he fortunately dodged and fell headlong over a flask in his hurry to get out of my way. The foreman came running over and grabbed my arm, telling me that the man floundering on the floor was the superintendent and begged me not to hit him. I had no intention of hitting him and I told the foreman all I wanted was for him and the superintendent to attend to their own business if they wanted me to stay there. The superintendent took himself off without another word and I went back to level up my plate. I had made up my mind to quit, even before the spat with the superintendent, but I thought I might as well put in the day, so as soon as the blast went on I told the foreman I wanted my money as soon as I pou ed, as I intended to quit. After coaxing me for a few minutes he finally got the money for me and I quit that shop for good.

The next morning I went up to Columbus and there I learned that they wanted several molders up at Mt. Vernon, to work on a lighthouse job, so I went on to Mt. Vernon that night, without spending any more time looking for work in Columbus. I arrived there about four o'clock in the evening and went direct to Cooper's shop and asked the foreman for a job. He asked me where I had worked and what class of work I was used to and then he invited me to go out into the yard with him. There, under the drop was a heap of castings about ten or twelve feet high, which had been condemned by the government inspector and had to be broken up. Pointing to this scrap heap he asked me if I thought I could make work like that. I laughed and said I hoped I could do better and then I began to inspect some of the plates to see what was wrong with them. Those in the heap were mostly for the first and second courses of the light house base and weighed about 1,800 each. The plates were made in the segment of a circle, with a flange all around the edge, which was planed to fit, and bracing flanges across the center. There was nothing difficult about the work, but the inspector was so particular that he would not allow a plate with a buckle or blemish of any kind to pass, even a piece of sand or slag the size of your thumb nail was sufficient to condemn the plate, and I saw plenty of castings in the scrap heap which would have passed muster in the best engine shops in the country. I was a little doubtful about my ability to make better work, or even as good, as that which I had seen condemned, but I was willing to give it a trial and agreed to go to work the next day.

Tom Kelly was the foreman and a reasonable man he was to work for, too. When I started in he told me that he had tried every plan he knew of to turn out good work and

if I had any new ideas about making the work to go ahead and try them. He gave me an apprentice boy as a helper and I started in on one of the heaviest plates. For the first week I had excellent luck and saved every plate I made and then I lost one. Tom looked at it, and shook his head, saying he hoped I wasn't going to turn out work like that. The face of the plate was spotted and dirty, and looked as if the iron had bubbled and boiled against the cope and had eaten into the sand, otherwise the plate was sound enough, but we knew it wouldn't pass. I was in a quandary to account for this and just then the boy came in with a riddle of new sand to mix the facing. I had mixed the facing myself before that and the sand looked much finer than what I had used, so I asked him where he got it and if he had used the same sand the day before. He said there was two grades of sand and he had used a shovel full of the fine sand because our copes didn't stick up as nice as the other fellows'. This explained the mystery of my bad plate and accounted for the loss of many castings which would otherwise have been saved; the sand was fine enough for stove plate and some of the men were trying to make castings weighing nearly a ton with it.

I told the foreman how I had come to lose the plate and he said he had concluded to lay us all off for a few days until he could have the flasks altered so that we could make the plates all in the cope, face down. After this we had better luck and saved more of the work, still there was plenty of good castings condemned, with those which were not so good.

When pay day came around they had two weeks' pay there, the bookkeeper came in and gave each of the men some money and asked me if five dollars would be enough for me. I asked him what was the reason I could not get all that was coming to me, and he said that Cooper had gone east to get some money and we would be paid off in full when he returned. I told him five dollars wouldn't pay my board and if that was all he could give me I would rather wait a few days and get all that was coming. On Saturday Cooper returned, but there was no sign of the ghost walking, and it was not until the following Saturday that we were paid off what was owing us for ten days' work, and when Tuesday, the regular pay day, came round and there were no signs of paying off I began to get uneasy and spoke to some of the other fellows, who were in the same humor as myself about it. Thursday came around and still no money and then I proposed that the molders have a meeting to see what we would do. The word was passed around and that night we met and drew up a paper protesting against the dilatory method of paying and declaring that unless we were paid in full and had the assurance of a regular pay day thereafter we would all quit and go elsewhere. This paper was signed by all of the molders but one and the next morning I handed the paper to Tom Kelly, with the request that he read it and then take it in to Cooper. In a few minutes Tom came out and told me Cooper wanted to see me in the office. I supposed he would call me and three or four others into the office and discharge us in the hope of intimidating the rest. If he did this I would get my money and it was easy enough to get a job somewhere else, so I was not particular. When I went into the office Cooper asked me if I had written that paper, handing me the protest. I acknowledged that I had and he wanted to know what it meant. I replied that if he could read it was written plain enough for any one to understand. Then he wanted to know if we doubted his honesty and I said that while I had no opinion to express about his honesty or dishonesty I had my doubts about a man who was compelled to run his business in his wife's name, and would feel safer if I had my money in my pocket. After "chewing the rag" for some time he finally agreed to pay us up in full the following day, but he could not promise to pay regularly after that, so I said I would go back to work. He kept his word and paid us off in full the next day. I was dissatisfied with the place and I told Tom I was going to quit. He persuaded me to stay a week longer than I had intended and when I finally quit and went into the office for my money Cooper flashed the foundry book on me, in which was a record of all the work, good and bad, that I had made and said he didn't intend to pay me a cent for the work I had lost. We had a row over this, but I hung to him for a whole day and refused to leave the office or allow him to leave until he paid me every cent coming to me.

I went from Mt. Vernon to Newark, then

to Wheeling and up to Youngstown without striking a job, but in the latter place I heard they were busy in a little shop in Niles. I went there and was fortunate in striking a job which lasted for nearly three months. They had no foreman in the shop, except a kind of a straw boss who did more ramming than any other man in the shop, and knew less. "Johnny" Carter, the proprietor, thought he knew enough to run the foundry, machine shop and pattern shop, besides doing the buying and selling for the concern without the assistance of any foreman. He knew more about molding than any of his molders and he could dictate to the pattern makers and the machinists. I managed to get along with him very well until a few weeks before he laid me off. We were making some hot blast stoves and among the other things were some explosion valves, merely a round plate with two circular flanges, one on the outer edge and the other set in about an inch. Now, any molder would know that a thin core which tapered from an inch up to about five-eights would not stand without nails, but Carter insisted that it was only a waste of time and money to nail that flange as, if it was tucked up good and snug, the core would stand the pressure of the iron. I tried to convince him that he was wrong and finally told him to go ahead and make one himself, or I would make one without nailing the core if he would stand there and see that I didn't queer it in any way. He told me to go ahead and if it didn't turn out good he would stand treat. I made him stay there until I had closed the flask and got him to feel the core, to see if it was snug enough to suit him. Then I put the pattern away, knowing how the experiment would turn out. When it came time to pour off I sent one of the boys into the office to tell Carter to come out and pour his work off, and I made him take the ladle and do the pouring, as he seemed to think there was more in the pouring than in the ramming. As soon as the metal had set I lifted the cope off and run a shovel over the casting to clear the sand off, then I called Carter over. He had been watching me and came over with a smile on his face. The plate was glowing hot and he didn't notice what I had seen as soon as I run the shovel over it. "There, Jim, didn't I tell you you could make those valves without nailing that core," but as the plate began to cool he noticed the black mark about two-thirds of the way round, where the core had floated and cut through, and said, "what is that black mark?" "That's the core, you —— fool," said I, "and the drinks are on you." Carter didn't have much use for me after that, and for two weeks he would hardly speak to me, but he kept me until all of the work was out and I was the last one to go.

Continued.

The Berlin Iron Bridge Co., of East Berlin, Conn., have just completed for the Geo. W. Stafford Mfg. Co., Providence, R. I., a new machine shop 50 feet wide and 174 feet long, two stories high. The building is constructed of brick and iron, and is so designed that two additional stories will be added in the future. The same company have also just completed a new car barn for the New Haven Street Railway Co., the barn being 86 feet wide and 188 feet long. The roof is covered with slate.

Pittsburg and Vicinity.

A degree of quietness has prevailed in the general iron market for the past few months, for which several reasons have been given. One is that extremely high prices have caused fear of a drop and buyers have concluded that the present is a good time to wait. Another reason is that the leading lines are sold so far into the future that consumers know there is little use in pushing the market.

Pig iron shows no weakness, and furnaces are increasing their production. The demand for iron is fully as strong as at any time recently. The furnaces are all sold ahead and are hurried to keep up with contracts. The entire production of pig iron, for the balance of the year at least, is sold and many contracts run into the month of January.

The H. C. Frick Coke Co., of Pittsburg, Pa., has sent out the following notice:

In view of the continued improvement in trade, and the better prices generally obtaining for almost all materials, taken in connection with the fact that coke has not had the advance that many things have, we have thought it advisable to give our men another advance in wages and at the same time advance the price of coke. Foundry

coke now sells at $2.00 per 2,000 pounds and crushed coke at $2.25 per 2,000 pounds.

The following are the prices of the different grades of iron:

No. 1 Foundry	$13.50 to $14.00
No. 2 Foundry	13.25 to 13.50
Charcoal, Foundry No. 1	17.50 to 18.00
Charcoal, Foundry No. 2	17.00 to 17.25
Charcoal, cold blase	24.00 to 00.00

Rolling Mill Castings—There is a good demand in some lines of this market, the business being quite satisfactory. Prices are as follows:

	Cents per lb.
Chilled rolls, up to 12 in. diameter	3¾
Do. over 12 in. diameter	3¼
Sand and Homogeneous steel rolls and pinions up to 12 in. diameter	2¾
Over 12 in. diameter	2¼
V tooth pinions, additional	¼
Housen and rolling mill castings not not otherwise specified	2
Spindles and coupling boxes	1¾
Squeezer castings	2
Squeezer pinions and wheels	2¼
Spurr and bevel wheels, large	2½
Spurr and bevel wheels, small	3 to 4

Copper—This metal finds a steady sale, while the price is quite stationary at 11¾ cents.

Pig Lead—A decline in price was reported in the price of pig lead, lead pipe, sheet lead, etc. The demand is active and business brisk. Prices are: Colored lots, 3.50c; small quantities, 3.55 to 3.60c; lead pipe, 5c; sheet lead, 5½c.

Pig Tin—The price of pig tin still rules at 16½ to 17c for small quantities.

The Lewis Foundry and Machine Company, of the South Side, has just completed an unusually large continuous rod mill for the Illinois Steel Company, containing about 1,000,000 pounds of metal. The company has also just installed at the works of the Atlanta (Ind.) Steel & Tin Plate Co. a large roll lathe of its latest design. This tool is intended to take two 12-inch cuts at the same time on chilled rolls up to 30-inch diameter.

The Pittsburg Steel Casting Co. has about completed the construction of a new 20-ton open-hearth steel furnace, which is expected to produce 40 tons a day. This will about double its present output.

The Totten and Hogg Iron and Steel Foundry Company, of this city, manufacturers of rolling mill engines and machinery, has just received an order for 62 large rolls and three trains of rolls, a 21-inch, a 16-inch and a 12-inch train with rolls complete.

Ground has been broken for the establishment of an additional plant at Wilmerding by the Westinghouse Air Brake Company, for the manufacture of malleable iron bumpers for freight and passenger cars. The plant is located adjoining the present works and will give employment to a large number of men.

Chicago and Vicinity.

There has been a slight lull among the foundries, particularly in the architectural line. The slacking off of business at this time has caused a feeling to spring up that the winter is to be a hard one, but we cannot forecast what the winter's business will be by this lull in trade. There are many reasons for it. The year is drawing to a close and as is the custom, people buy as little as possible, the latter end of the year. Then again the people are becoming more cautious. Past experiences have taught them not to rush into a winter's business until they know what that business is to be. As usual, building operations will diminish as the winter draws near, and it is but natural the architectural shops will be slack, as building operations grow less. It is but reasonable to suppose that in the returning prosperity, there will be an occasional halt before we have reached good times. Though things may look a little blue now and then, business will not fall back again to the depths that it was during the panic. The only thing to be deplored is the low price of castings. One would think that the price in castings would keep pace with the advance in iron, but such has not been the case. The prices are quoted to-day as low as before iron began to advance. The only explanation as to how this can be done is that some of the foundry men contracted for large amounts of iron before the advance set in, and instead of reaping the profits of their good judgment have kept the prices down, thinking that they might perhaps freeze out some of their less fortunate competitors. Until these contracts expire, we can expect no advance in the price of castings.

J. C. O'Brien is building a new foundry on Carroll avenue. F. B. Whitcomb will have charge.

Chicago Hardware Co. have started the foundation for their new works at North Chicago. Will build a brass foundry 60x110 feet and an iron foundry 80x150 feet. Expect to be running January 1st, 1896.

BUFFALO
BLOWERS.
UNEQUALLED
EFFICIENCY, DURABILITY,
MINIMUM POWER.
BUFFALO
FORGE CO.
BUFFALO, N.Y.
U.S.A.

BUFFALO FORGES.
AMERICAS BEST.
THE WORLD'S STANDARD.
BUFFALO
FORGE
BUFFALO, N.Y. U.S.A.

BUFFALO FAN SYSTEM
OF HEATING AND
VENTILATING
ALL
LARGE
BUILDINGS.
BUFFALO
FORGE Co.
BUFFALO, N.Y.
U.S.A.

BUFFALO
VENTILATING FANS
ELECTRIC, STEAM
AND PULLEY TYPES,
GREATEST AIR VOLUME,
LEAST POWER
BUFFALO FORGE CO.
BUFFALO, N.Y. U.S.A.

BUFFALO
SHAVING
EXHAUSTERS.
FOR
HANDLING
REFUSE IN ALL WOOD
WORKING INDUSTRIES
BUFFALO
FORGE Co.
BUFFALO, N.Y. U.S.A.

SAFETY TRAVELING CRANE.

Especially well adapted for Foundry use or wherever careful handling of loads is required. Thus copes and moulds can be lifted and transported with absolute safety. There is no jumping of chains; no jarring of load; no loss of sand; no breaking down of mould.

Will Hold the Load at any Point.

The chains wind on a drum, having right and left spiral threads. The hand chain wheel is removed from the line of the load by means of extended shaft a fact which is of great advantage to the operator. The crane is supplied with roller bearings and travels with an easy steady movement. It is equally well adapted for heavy or light loads.

Let us give you an estimate. State required span and capacity.

LATHES, DRILLS, PLANERS, GEAR CUTTING,
DOUBLE CHAIN SCREW HOISTS.

Edwin Harrington, Son & Co.

INCORPORATED.

1521 Pennsylvania Ave. - PHILADELPHIA, PA

FOR SALE!

At a Bargain.

Having closed our Foundry, the following appliances are for sale at a low price.

1 Cupola, shell 46 in, diameter. 40 feet high.
1 Sturtevant Blower, No. 4, with counter shaft and pipe.
1 Tumbling Barrel, 6 feet x 22 inches.
1 " " 5 " 22 "
1 " " 2½ " 12 "
1 Ladle with shank, 1,500 pounds.
1 " " " 800 "
3 " " " 250 "
1 Foundry Crane capacity 5000 pounds.
1 Yale & Towne latest Improved Traveler, capacity 10,000 pounds.

For further particulars, address

G. V. BRECHT B. S. Co.

1201 Cass Avenue,

ST. LOUIS, - - MO.

Don't be FOOLED and think High Silicon Irons are a "cure all." Remember a "silk purse is not made out of a sow's ear."

The Best Material Only,
Complete Analysis and
Careful Testing . . .

In the Largest Chemical and Physical Laboratory devoted to Foundry Iron in the United . . States is what makes . .

CLINTON INSPECTED FOUNDRY IRON

THE IRON IT IS

Clinton Iron & Steel Co.

PITTSBURG, PA., U. S. A.

"Columbus" Steel Tubular Wheelbarrow.

Made throughout of the best quality of high grade steel. Tray stamped without joint, seam or rivet, with edge bound over steel rod. Handles, Legs and Wheels the strongest put upon Tubular Barrows.

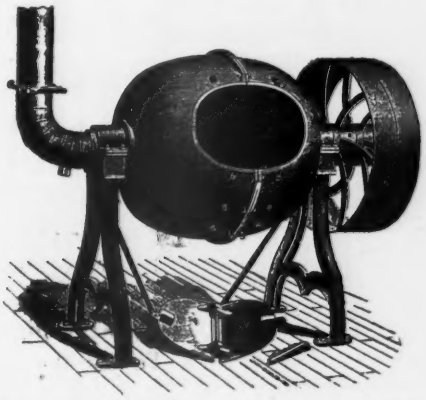
Made in nine different sizes. Largest manufacturers in the United States of TUBULAR BARROWS, STEEL CHARGING BARROWS and WOODEN BARROWS of every variety. Write for catalogue to

The Kilbourne & Jacobs Manufacturing Co.

LINCOLN STREET, COLUMBUS, OHIO.

STOVER'S IMPROVED

EXHAUST TUMBLING BARREL



The Stover Egg Shaped Barrel does double the work of any other with less noise and power. It gives the contents a double motion or action—from ends to center and from side to center—causing a thorough mixing and rubbing together of all the parts contained therein, cleaning and polishing the contents better and quicker than any other form of barrel.

Sent on 30 days approval to any responsible manufacturer of light castings, malleable iron wire nails, or any other small articles that require cleaning and polishing.

For full particulars, address,

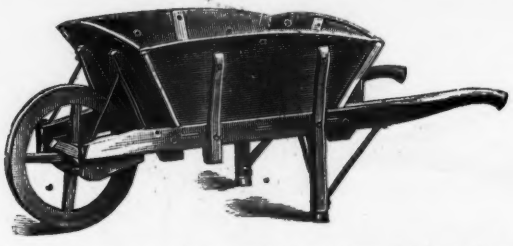
Stover Manufacturing Co.

205 RIVER STREET,

FREEPORT, ILL

Lansing Hand-Made Scrap Iron Barrow

Figure 238.



This barrow is made for heavy work in and about foundries, rolling mills, machine shops, etc., and is made of the very best seasoned timber. Handles are made of 2 x 3 in. white oak; box is made of 1¼ in. maple. Size of box at top, 26 in. wide at wheel end, 30 in. wide at handle end, 34 in. long. Has a heavy wheel 19 in. in diameter, 1¾ in. tread, and has ¼ in. tire; we put heavy iron bands on the ends of the hub. Weight of barrow is 125 lbs. Has iron bands on ends of legs and all iron braces are of ⅝ in. round iron. All irons are bolted.

Telegraph name, Seacoast.

WRITE FOR PRICES.

We make a Specialty of Steel and Wood Barrows for Foundries.

LANSING WHEELBARROW CO., LANSING, MICH.

"Keep's Test" Apparatus

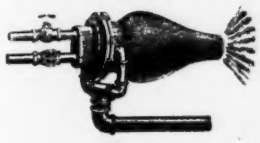
Enables the founder . . . . . .
To make the strongest castings . .
To make each cast uniform . . .
To make pig iron that costs the least
To use the most scrap . . . . . .

To Make the Most Money

Send for circulars and prices to

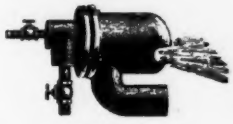
W. J. KEEP, Detroit.

Patented.



No. 6.

Patented.



No. 4.

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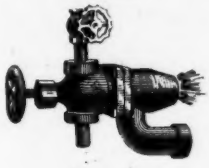

No. 8.

The Thurman Fuel Oil Burner Co.

DESIGNERS, CONTRACTORS AND ENGINEERS for COMPLETE FUEL OIL EQUIPMENT.

Plans, Specifications and Machinery for Complete Power Plants and Machinery Specialties. The only Perfect Crude Oil Burners on the market. **Acknowledged the best.**

It is economical, reliable, requires no expert to manage, cheaper than coal. For boilers, furnaces, forges, ovens, dryers, brick kilns, potteries, etc. No soot, no sparks, no smoke.

SPECIALTY FUEL ECONOMY.

We make a specialty of Fitting Foundries Complete with Fuel Oil Equipment for Crucibles and Core Ovens.

We can bake your cores quicker and cheaper with our system than with coal. Write us.

General Offices, 31 and 32 Cordova Bld.

INDIANAPOLIS, - - INDIANA.

ESTABLISHED 1854

Brooklyn Fire Brick Works

CUPOLA BLOCKS,
FIRE SAND,
FIRE CLAY,
FIRE MORTAR,
KAOLIN

AND ALL FIRE MATERIAL REQUIRED FOR FOUNDRY PURPOSES.

Send for Illustrated Catalogue and Prices.

88 Van Dyke Street, BROOKLYN, N. Y.

WE BURN HARDWOOD

CHARCOAL

FOR FIRES.

CAR LOTS DELIVERED TO ALL PARTS OF THE U.S.

OUR CHARCOAL FACING FOR

BRASS FOUNDRIES

IS UNLIKE ANY OTHER.

IT WILL PAY YOU TO KNOW ABOUT IT.

SPRINGFIELD FACING CO.

SPRINGFIELD, MASS.

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THE FOUNDRY

The only foundry paper published in the world, and an authority on all matters pertaining to the foundry business.

RATES OF SUBSCRIPTION.

Single subscription to all parts of the United States and Canada, $1 per annum.
" " Universal Postal Union, 1.50 "
Eight or more subscriptions at one time, 75 cents each.

ADVERTISING RATES.

One page - -	per month,	$20.00
Half page - - -	"	12.00
Quarter page - -	"	7.00

When space is specified an extra charge of five per cent. on the above figures will be made. All pages between front cover and reading matter reserved for whole page advertisements.

Advertisers in THE FOUNDRY have the privilege of discontinuing their advertisements at any time after they have had three insertions, and will only be charged pro rata for the number of insertions printed. They also have the privilege of changing advertisements as often as desired.

The publishers of THE FOUNDRY appreciate the fact that it is customary for publications, especially the class known as Trade Journals, to quote a rate for advertising from which greater or less discounts are given, according to the persistency of the advertiser. This system is manifestly unfair as tending to show partiality. We have deducted the usual discount before quoting rates, thus giving it to all alike, and no reduction of any sort on the above rates can be made.

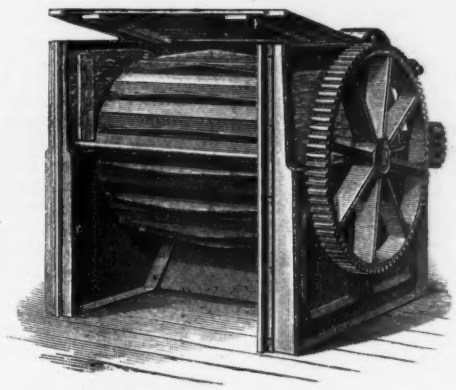
Copy for advertisements should be in by the 25th of the month preceding publication.

Brown & Sharpe Mfg. Co.,

FOUNDRY RATTLERS

DIAMETER.

No. 1—23½ inch
No. 2—31½ inch
No. 3—31½ inch



LENGTH.

No. 1—26 inch
No. 2—31½ inch
No. 3—52 inch

PROVIDENCE, R. I.

DO YOU MAKE YOURS?

? ? ? ? ? ?

HENRY HANSEN

In his paper read before the September meeting of the Western Foundrymen's Association said: "The ordinary chaplets for which almost every foundry used to rely on the blacksmith nearest at hand, which has probably been the cause of more castings being discarded and patched up than any other thing of their size are now being made by special methods and presented in a far superior condition, besides being placed on the market at a price that would not keep a blacksmith in tobacco, at the same time there are many foundries that still insist on making their own inferior Chaplets."

JOHN PETTIGREW

Superintendent of the Illinois Steel Company's foundry, at Joliet, Ills. said at the same meeting on this subject: "It is only about six months ago that I first bought factory made chaplets. We were making our own chaplets and lost a great many castings from their not being properly made. After we had bought the first lot for. I think, 60 cents a hur dred, I commenced to figure up the list of those we had made and found it had been at least $2.50 and besides were not as good an article."

WE KEEP ALL KINDS IN STOCK.

Cleveland Chaplet & Mfg. Co.

CLEVELAND, OHIO.

BUYERS' DIRECTORY.

ALUMINUM.
Cowles Electric Smelting & Aluminum Co., Lockport, N. Y.

AIR HOISTS.
Whiting Foundry Equipment Co , Harvey, Ill.

BARROWS, TRUCKS, ETC.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.

BLOWERS.
Buffalo Forge Co., Buffalo. N. Y.
Connersville Blower Co., Connersville, Ind.
Garden City Fan Co. Chicago, Ills.
Root, P. H. & F. M. Company, Connersville, Ind.
Sturtevant Company, The B. F., Boston, Mass
Wilbraham Baker Blower Co., Philadelphia, Pa.

BRONZES.
Cowles Electric Smelting and Aluminum Co., Lockport, N. Y.

CAMERAS.
Eastman Kodak Co., Rochester, N. Y.

COKE.
Washington Coal and Coke Co., 7 Wood St., Pittsburg, Pa.

CORE COMPOUNDS.
Stewart, W. H., 182 Front St., New York.

CORE OVENS.
Millett Core Oven Co., Brightwood, Mass.

CORE OVEN CARS.
Lansing Wheelbarrow Co., Lansing, Mich.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
Foundry Outfitting Co., Detroit Mich.

CRANES.
Craig Ridgeway & Sans, Coatesville, Pa.
Harrington, E., Sons & Co., Philadelphia, Pa.
Phœnix Iron Works Co., Cleveland, Ohio.
Shaw Electric Crane Co.
Whiting Foundry Equipment Co., Harvey, Ill.

CRUCIBLES.
Hussman Crucible Co., St. Louis, Mo.
Joseph Dixon Crucible Co., Jersey City, N.J.
McCullough, Dalzell & Co, Pittsburg, Pa.
Taylor Crucible Co., Philadelphia, Pa.

CUPOLAS.
Foundry Outfitting Co., The, Detroit, Mich.
Whiting Foundry Equipment Co., Harvey, Ill.

FIRE-BRICK.
Brooklyn Fire Brick Works, Brooklyn, N. Y.
Garden City Sand Co., Chicago, Ill.
Obermayer Company, The S., Cincinnati, Ohio
Ohio Sand and Clay Company, Columbus, Ohio
Paxson, J. W., & Co., Philadelphia, Pa.
Smith Foundry Supply Company, The J. D., Cincinnati, Ohio.
Whitehead Bros. Co. New York.

FOUNDRY LIGHTS.
Sherry Torch Co.
Wm. Halpin, New York.

FOUNDRY LADLES.
Foundry Outfitting Co., The, Detroit.
Obermayer Company, The S., Cincinnati, Ohio.
Paxson & Co., J. W., Philadelphia, Pa.
Phœnix Iron Works Co., Cleveland, Ohio.
Smith Foundry Supply Company, The J. D., Cincinnati, Ohio.
Whitehead Bros. Co. New York.
Whiting Foundry Equipment Co., Harvey, Ills.

FOUNDRY PLANS.
Foundry Outfitting Co., The, Detroit, Mich.
Whitting Foundry Equipment Co., Harvey, Ills.

FOUNDRY SUPPLIES.
Foundry Outfitting Co., The, Detroit, Mich.
Joseph Dixon Crucible Co. Jersey City, N J.
Garden City Sand Co., Chicago, Ill.
Obermayer Company, The S., Cincinnati, Ohio
Paxson & Co., J. W., Philadelphia, Pa.
Smith & Co., J. D., Cincinnati, O.
Thurman Fuel Oil Burner Co., Indianapolis, Ind.
Whitehead Bros. Co. New York.

IRON BUILDINGS.
Berlin Iron Bridge Company, East Berlin, Conn.
Wrought Iron Bridge Company, Canton, Ohio.

IRON FILLER.
Vreeland Tompkins, Jersey City, N. J.

MANGANESE AND SILICON.
Cowles Electric Smelting and Aluminum Co., Lockport, N. Y.

MOLDING MACHINES.
Tabor Mfg. Company, 113 Liberty st., New York

MOLDING SAND.
Ayers, E. M., Zanesville, O.
Downerd & Sons, The J. D., Zanesville, O.
Foundry Outfitting Co., The, Detroit.
Garden City Sand Co., Chicago, Ill.
Paxson & Co., J. W., Philadelphia, Pa.
Whitehead Bros., 515-7 West 15th st., New York.

PATTERN FILLETS.
Canton Fillet Co. Canton, Ohio.

PATTERN MAKERS.
The Gobeille Pattern Co., Cleveland, Ohio.

PATTERN MAKERS SUPPLIES.
Milwaukee Foundry Supply Co., Milwaukee, Wis.

PATTERN TRIMMERS.
Fox Machine Co., Grand Rapids, Mich.

SNAP FLASKS.
C. H. Green & Co., Syracuse, N. Y.
Adjustable Snap Flask Co., Liberty, Ind.

SPRUE CUTTERS.
Gould & Eberhardt, Newark, N. J

TUMBLING BARRELS.
Brown & Sharpe Mfg. Co., Providence, R. I.
Paxson & Co., J. W., Philadelphia, Pa.
Stover Mfg. Co., Freeport, Ills.
Whiting Foundry Equipment Co., Harvey, Ills.

VENTILATOR IRONS.
Delvin, Thos. & Co. Philadelphia, Pa.

The A B C of Iron.

The best book for foundrymen published. It is issued in handsome cloth binding, and gives much valuable matter on how to reduce cost of mixtures, and on grading and numbering of pig-iron.

FORMER PRICE $2.00

NOW $1.00.

Order Now of

Foundry Publishing Co.

Griswold Street,

DETROIT, - - MICH.

"DIAMOND"

PHOSPHOR

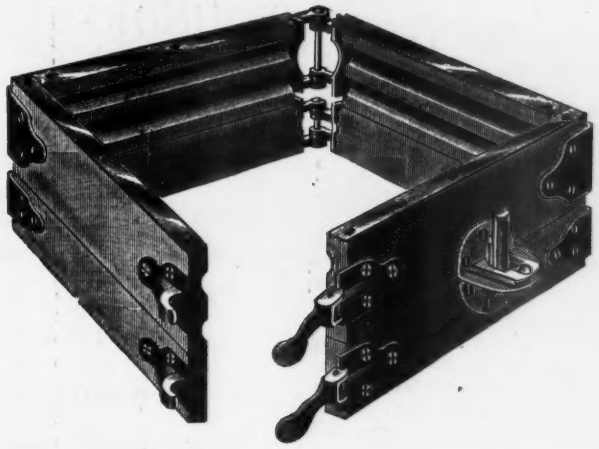
BRONZE

And BRASS CASTINGS of Every Description, Heavy or Light. Let us figure on your wants.

E. Stebbins Mfg. Co.,

BRIGHTWOOD,
MASS.

SPECIAL SNAP FLASK



WE offer this special Flask at special prices. It is made of 1¼ inch Norway Pine and is the most perfect Flask on the market. We will send sample (any size) on receipt of $2.00. Sent C. O. D. Get our prices and discounts on large orders.

C. H. GREEN & Co.

1415 Grape Street, - - SYRACUSE, N. Y.

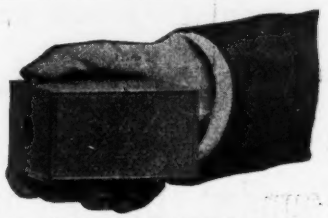
ATTENTION FOUNDRYMEN!

By using this process of making sash weights you reduce cost of production and double your capacity with the same dimensions of floor space; Sash Weights are made standing on end. For terms of **shop right** or **royalty** and further particulars, address

EWALD OVER,

VICTOR FOUNDRY. **INDIANAPOLIS, IND.**

Pocket Kodak, $5.00



" One Button Does It, You Press It."

Makes pictures large enough to be good for contact printing and good enough to enlarge to any reasonable size.

Pocket Kodak loaded for 12 pictures, 1½ x 2 inches, - $5.00.
Developing and Printing Outfit, - - - - - - 1.50.

Sample photo and booklet for two 2-cent stamps.

EASTMAN KODAK COMPANY,
Rochester, N. Y.

FLORIDA
And the Sunny South.
VIA
BIG FOUR ROUTE.

The frosty mornings, the chilly nights, are the first warning notes from Winter's trumpet, and we watch the Sun in his southward course, longing to follow him to a land where it is summer always.

Are you going south this winter?

The "Big Four Route" is the best line from Chicago, Peoria, St. Louis, Cleveland, Columbus, Indianapolis, Benton Harbor, Sandusky and intermediate points, with Solid Vestibuled trains, Buffet Parlor Cars, Wagner Sleeping Cars and Dining Cars to Cincinnati, where direct connections are made with solid trains with Pullman Sleeping Cars of the Chesapeake & Ohio, Queen & Crescent Route and Louisville & Nashville Railways, to Hot Springs, Old Point Comfort and all points in Virginia and The Carolines; to New Orleans and all principal cities in the south.

Through Wagner and Pullman Sleeping Cars daily between St. Louis and Washington via the "Big Four" and the picturesque C. & O. Ry.

Tourists rates will be in effect.

Call on or address any Agent of the Big Four Route or its connecting lines, or address

E. O McCORMICK,
Pass'r Traffic Manager,
D. B. MARTIN,
Gen. Pass. & Tkt Agt
"BIG FOUR ROUTE" **CINCINNATI, O.**

AMERICAN

FOUNDRY PRACTICE,

—TREATING OF—

Loam, Dry Sand and Green Sand Molding.

And containing a Practical Treatise upon the management of Cupolas and Melting Iron.

By THOMAS D. WEST,

Practical Iron Molder and Foundry foreman.

391 PAGES. FULLY ILLUSTRATED.

Price, $2.50, Post Paid; with THE FOUNDRY, One Year $3.00.

A REVOLUTION

In Pattern Making was the result of the introduction of the

FOX UNIVERSAL TRIMMER

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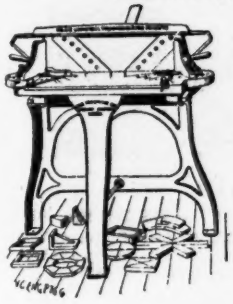

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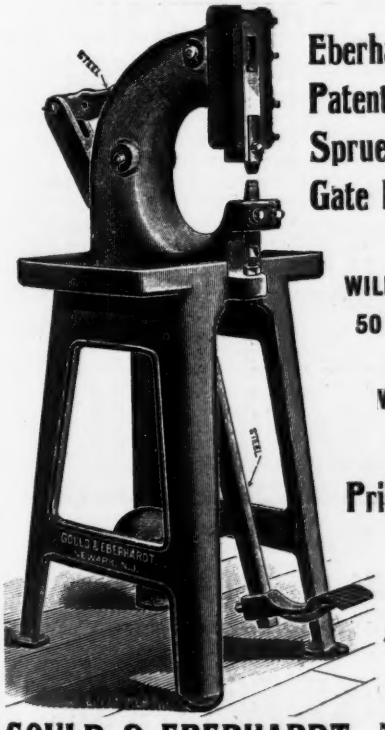

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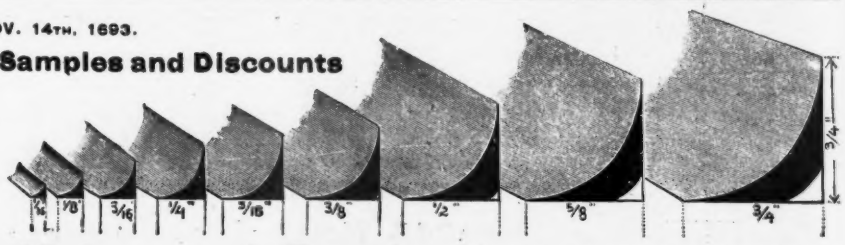

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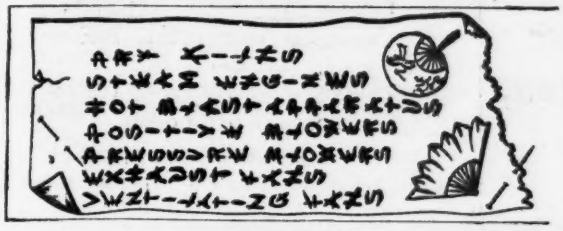

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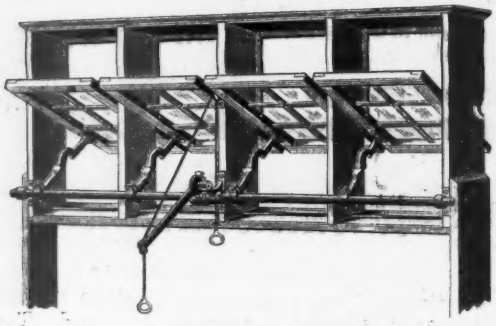

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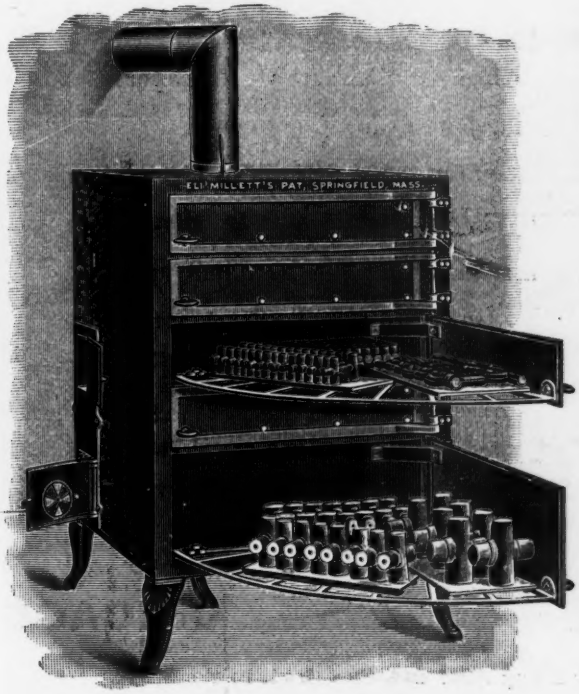

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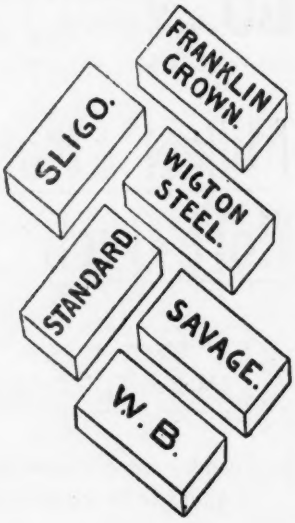

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